

THE IMPACT OF RECENT
PLANNING-PROGRAMMING-BUDGETING REVISIONS,
NEW CONTRACT POLICY CHANGES,
AND CERTAIN EXTERNAL FACTORS
ON AIRCRAFT PROCUREMENT
IN THE DEPARTMENT OF THE NAVY

William C. Cowperthwait

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DEPARTMENT OF THE NAVY

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CHAPTER I

INTRODUCTION

The increased cost and sophistication of military aircraft require detailed procurement planning and financial management. This thesis will consider three factors which affect the procurement of Navy Aircraft and then relate these factors to an actual program--the CH-53 Heavy Assault Helicopter. The study was undertaken because of the personal interest on the part of the author as a Naval Aviator for eleven years and because of the increased sophistication, employment and cost of military helicopters during that period.

In 1960, the production of military helicopters of all services totaled 494, annual production increased until 1967 when production was 2,448 (see Table 1). Because of security limitations, the production figures for the years 1968 and 1969 are not available, however, programmed production figures for the years 1970 and 1971 have been added to Table 1 to illustrate that a peak was reached during or after 1967 and that production has declined annually since then.

TABLE 1

PRODUCTION OF MILITARY HELICOPTERS

Year	Total	Air Force	Navy	Army
1960	494	57	147	284
1961	366	42	187	137
1962	624	33	208	313
1963	762	45	165	462
1964	1099	34	145	828
1965	1488	60	195	1215
1966	2242	80	253	1831
1967	2448	73	279	2096
Programmed Production Figures:				
1970	1259			
1971	1009			

Source: Years 1960-1967 obtained from Aerospace Facts and Figures 1970, Aerospace Industries Association of America, Washington, D.C. (New York: Aviation Week & Space Technology, McGraw-Hill, 1970), p. 34; years 1970-1971 obtained from Department of Defense, OASD, Comptroller (Press Package), 2 February, 1970.

The Navy figures in Table 1 include Marine Corps Helicopters and these comprise the total of assault helicopters procured by the Navy for the Marine Corps.

These figures on Table 1 are shown to illustrate that a peak has been reached in terms of procurement funding to meet a threat (South East Asia). Though the threat seems to have diminished to some degree, the change does not relieve the Department of Defense or the Navy of responsibility for

developing viable weapons systems to meet an ever-changing security threat. The problem of developing and purchasing modern weapon systems is expensive and continuous because of the explosive technological climate existing in and out of the United States. To compound the problem there is the recent decrease in annual Defense Appropriations which further limits the procurement capability of the military departments. This trend prompted Mr. Robert C. Moot, Assistant Secretary of Defense(Comptroller), to state that "Defense spending no longer dominates total Government spending." He goes on to say that Defense spending in the 1971 Budget is seven per cent of the Gross National Product and about 34.6% of the total Federal Budget.¹

Addressing the Defense portion of the Federal Budget still further, he poses the question about returning to pre-VietNam spending levels and states it should not be done:

The reason is quite simple; pay and price increases since 1964 have eaten up \$16 billion of the \$21 billion added to the Defense Budget since then. In real terms--that is dollars of constant buying power, our budget for FY 71 is only \$5 billion or 7.5% higher than the prewar level of 1964.²

Though Defense spending has been on the downward trend since 1968, and there is still a great deal of public and

¹Address delivered at the Naval War College entitled, "Defense Spending Myths and Realities," quoted in the Naval War College Review, XXIII (December, 1970), 5.

²Ibid., p. 6.

Congressional pressure to decrease it even more, it does not relieve DOD of the responsibility of maintaining national security--a part of this responsibility is developing a weapons inventory capable of meeting ever-changing security threats.³ For this reason, it appears that the successful weapon system of the future will be the one that includes the most effective and efficient procurement procedures.

The question of Naval Aircraft Procurement can be confusing if the many contributing departments are mentioned and no relationships are shown between them. To simplify matters, a brief review of the chain of command from the Secretary of Defense (SecDef) down to the Project Manager in the Naval Air Systems Command (NavAir) is outlined to give the reader some perspective and understanding of the various relationships. This review has been included in the Introduction because of its relative importance throughout the study.

The requirement for a weapon system begins to take shape in the Planning Phase of what is called the Planning, Programming and Budgeting System (PPBS). During this phase, plans are developed and objectives of the military departments of DOD are analyzed to determine what is needed to counter a possible security threat. Based upon this planning, the requirement for a specific weapon system is more clearly defined

³Ibid., p. 9.

in the Programming Phase where it is made the part of a Program Objective. It is here that total numbers, characteristics, etc., are formulated and the actual procurement is effected. Throughout Planning and Programming, it is necessary to expend funds and this is taken care of by the Budgeting Process.

For the past ten years PPBS has been the means by which DOD directed the entire Defense Effort, therefore it plays a key role in the development and procurement of any weapon system in DOD. Any major revisions to PPBS directly affect the procurement process--because of this condition, Chapter II will review the most recent PPBS revisions and analyze possible future revisions of the Navy Budgeting Process.

The second factor affecting procurement is Contracting and Chapter III will list the most frequently used contracts in their previous order of DOD preference and will cite the advantages and disadvantages of each. Procedures used in the process of acquiring major weapon systems are then discussed to reflect the changed attitudes of DOD in terms of contracting and procurement. The purpose of the chapter is to define previous DOD contract preference, identify important changes that have occurred under Secretary Laird and Deputy Secretary Packard since their appointments, and to compare the recent changes with the recommendations of an earlier independent study.

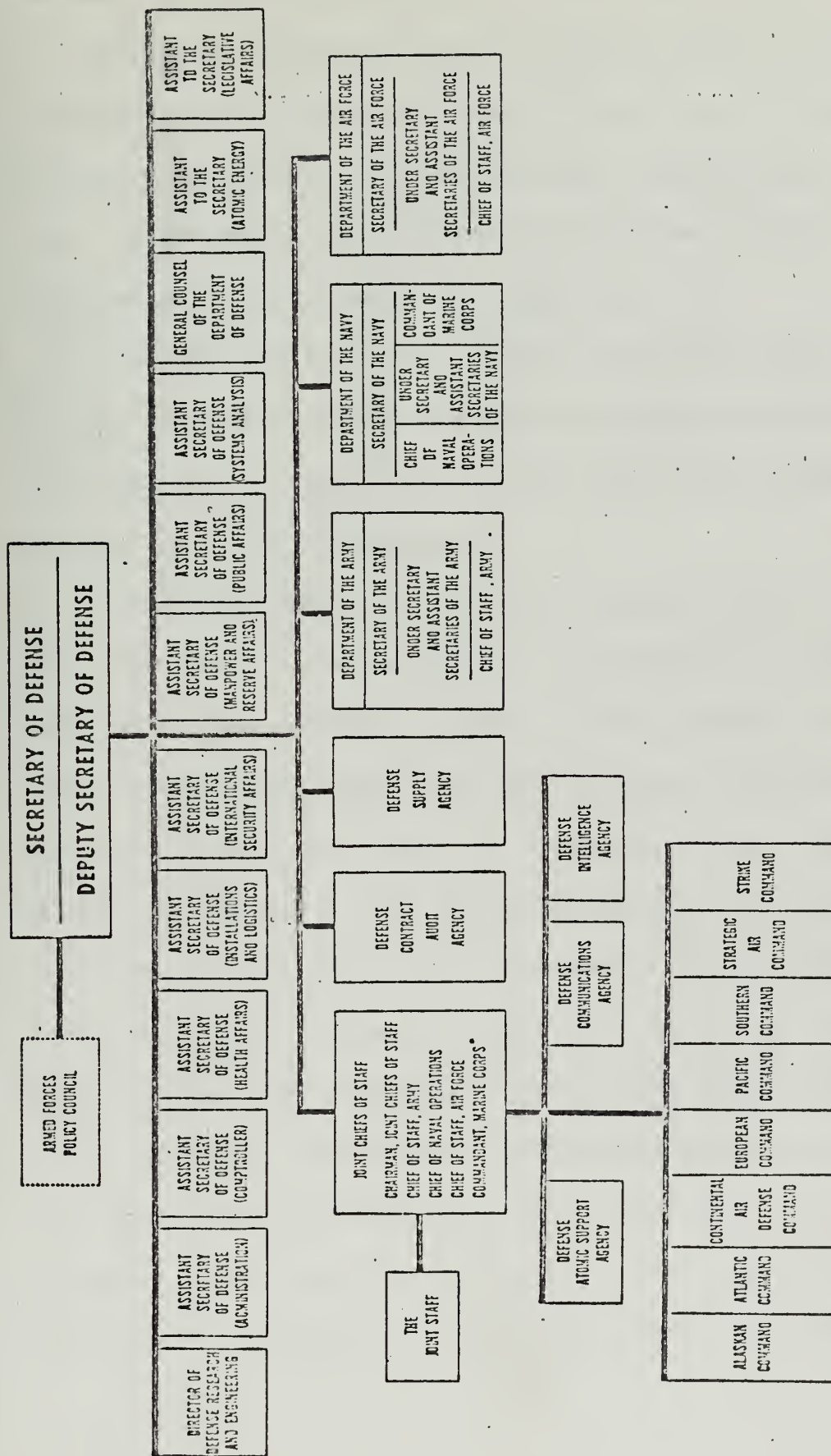
Defense Contracting is a very complicated and diverse area, for this reason the scope of the chapter will be limited to those contracts utilized in helicopter procurement. The chapter is intended to illustrate basic DOD policy in contracting and to serve as the basis from which a comparison with an actual contract can be made in Chapter IV.

Factors external to PPBS and Contracting will be discussed in Chapter IV. The purpose here is to compare the procedures described in Chapters II and III with an actual procurement program to see what changes occur that are beyond the scope of each procedure. The planning, programming, etc., and contracting procedures discussed appeared to be directed towards making the procurement process more effective and efficient. These efforts are sometimes helped or hindered by uncontrollable external factors--their effect will be shown relative to the acquisition of the CH-53 Assault Helicopter.

Chapter V will summarize the important points of each chapter, analyze their importance in the procurement process and enumerate the conclusions of the study.

The Chain of Command

The Department of Defense (DOD) organizational structure is shown in Figure 1. A large and complicated organization of this nature must be broken down into smaller elements and analyzed to gain any understanding of the command structure



*When pertaining to Marine Corps matters.

Fig. 1.--Department of Defense Organization

Source: Navy Logistics Management School, Navy Department Planning and Management Systems Source, Organization (Washington, D.C., 1970). (Same source used for Figures 1-5.

and working relationships. After the Secretary, Mr. Laird and his Deputy, Mr. Packard, the next level in DOD is the Assistant Secretary level. At this level, the Assistant Secretaries of Defense (Comptroller, Systems Analysis, Installations and Logistics, and Research and Engineering) would be the four most involved with procurement and budgeting.

Going from the Staff to the Line area at the same level, the military departments and defense agencies are listed. The Joint Chiefs of Staff (JCS) is shown and this is made up of the military heads of the services.

The Department of the Navy (Figures 1 and 2) differs basically from the other military departments in that it encompasses two distinct, though closely related, military services--the Navy under the Chief of Naval Operations (CNO) and the Marine Corps under its Commandant (CMC). The Office of the CNO (Figure 3) has within it several key divisions: (a) DCNO(Air) who is the program sponsor for aircraft, (b) The Director of Navy Program Planning and (c) DCNO(Plans and Policy). Each of these play important roles in the procurement process.

Both CNO and CMC have command and funding responsibility for their respective military operations, which include budget formulation and execution related to those appropriations distinctive to each service and aside from the Secretariat and

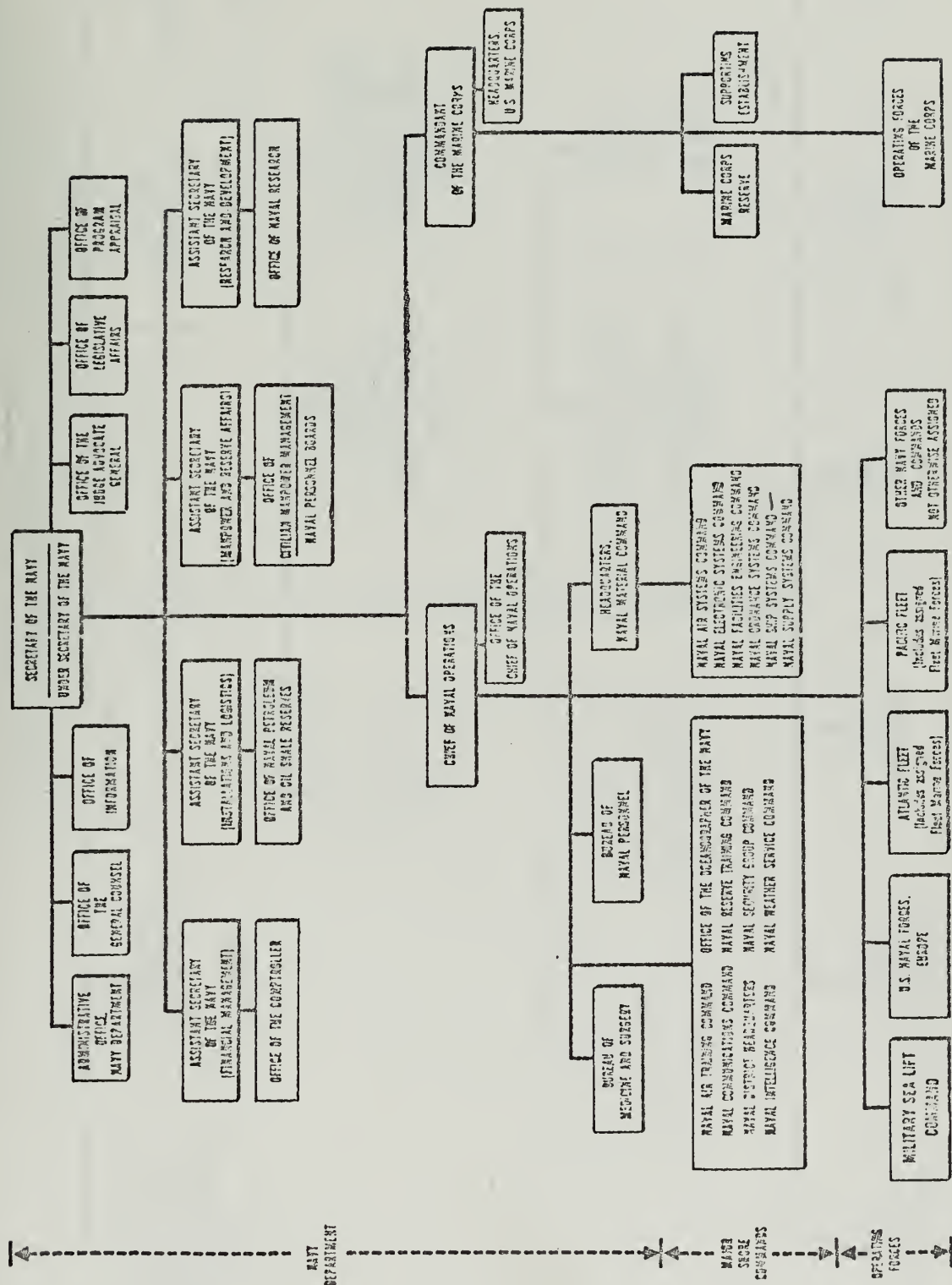


Fig. 2.--Department of the Navy Organization

Source: See Figure 1, p. 7.

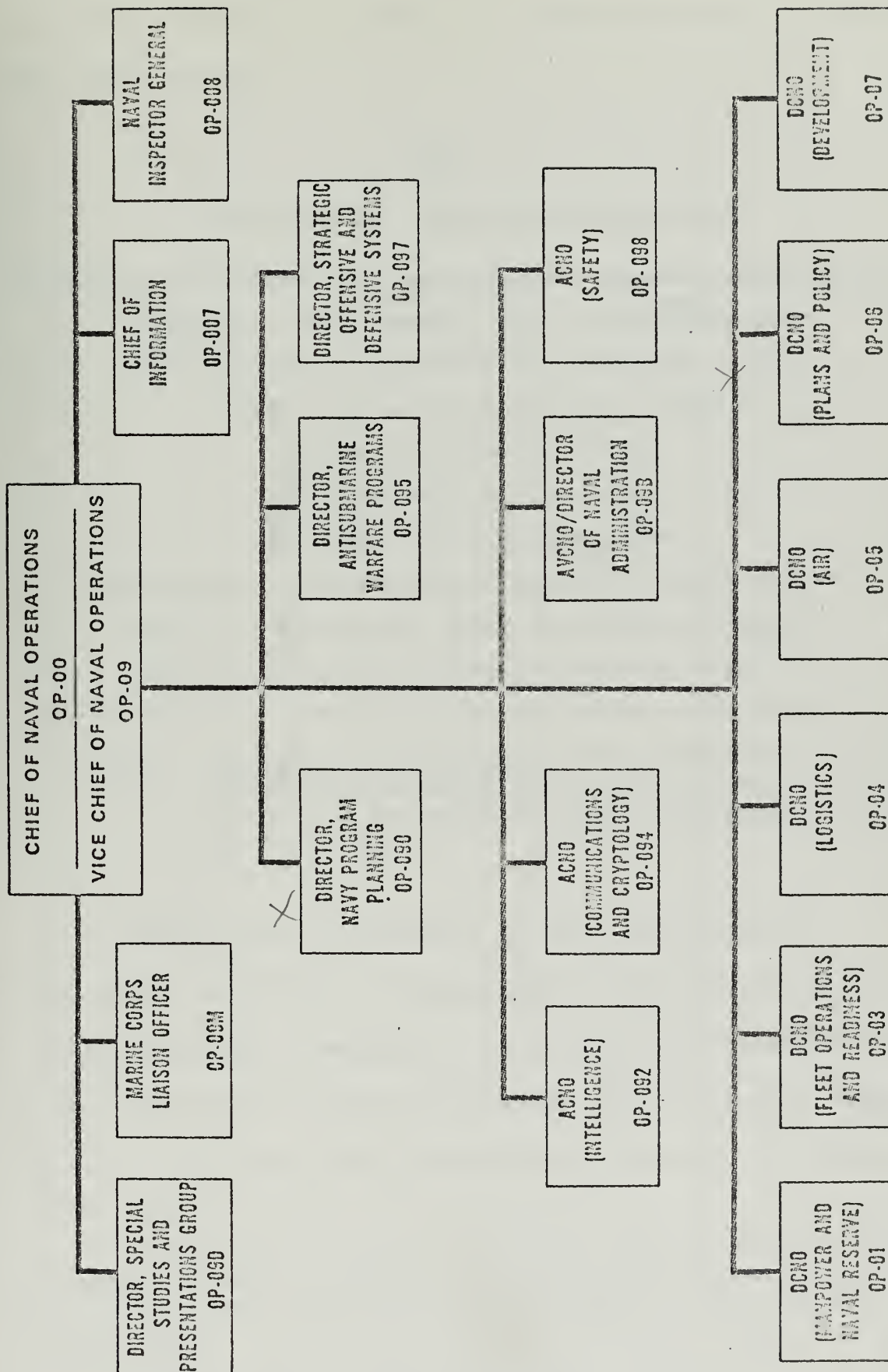


Fig. 3.--Office of the Chief of Naval Operations

Source: See Figure 1, p. 7.

the staff offices.⁴ A list of the Appropriations is shown on the Table below:

TABLE 2
APPROPRIATION BUDGET STRUCTURE (NAVY)

Research, Development, Test and Evaluation ✓
Procurement of Aircraft and Missiles, Navy ✓
Shipbuilding and Conversion, Navy ✓
Other Procurement, Navy
Procurement, Marine Corps ✓
Military Construction, Navy
Operations and Maintenance (Navy and Marine Corps) ✓
Military Personnel (Navy and Marine Corps) ✓
Reserve Personnel (Navy and Marine Corps) ✓

Source: The Programming System, Navy Department Planning and Management Systems Course, Navy Logistics Management School, Washington, D.C., 1970, p. 96.

The Assistant Secretary of the Navy (Financial Management) (ASN(FM)) is designated as Comptroller of the Navy (NAVCOMPT) and is responsible for overall coordination of budget and fiscal matters related to Navy and Marine Corps programs. The principle subordinate in the budget process

⁴ "The Chief of Navy Material is responsible for meeting the material requirements of the Navy and is also responsible for meeting the particular material support needs of the Marine Corps." Quoted from "Budget Process in the Department of the Navy," Armed Forces Comptroller, April, 1969, p. 33. Article by RADM W. D. Gaddis, Director of Budget and Reports, U.S. Navy.

within NAVCOMPT is the Director of Budget and Reports in the Office of the Comptroller of the Navy(Budget)(NCB), who with his staff perform most of the functions as a responsibility of NAVCOMPT--under the supervision of the Comptroller and Deputy Comptroller.

Because this study deals mainly with aircraft procurement, only two Appropriations will be discussed--Research, Development, Test & Evaluation (RDT&E) and Procurement of Aircraft and Missiles, Navy (PAMN). RDT&E is administered by the Assistant Secretary of the Navy(Research and Development) ASN(R&D) with the aid and assistance of CNO and the Chief of Naval Material (CNM) of which the Naval Air Systems Command (NavAir) is a part. The PAMN Appropriation is the responsibility of the Naval Air Systems Command.

Figure 4 identifies the units within the Naval Material Command (NMC). Because of the specialized nature of the reports, etc., which emanate from the Commands in NMC to the CNO level and because of the relationship that exists between program sponsor at CNO and project manager at NavAir, an informal line of communications is established which often bypasses the chain through NMC Headquarters. The result of this situation is that often times formal reports are submitted through the NMC that have already been approved at the CNO

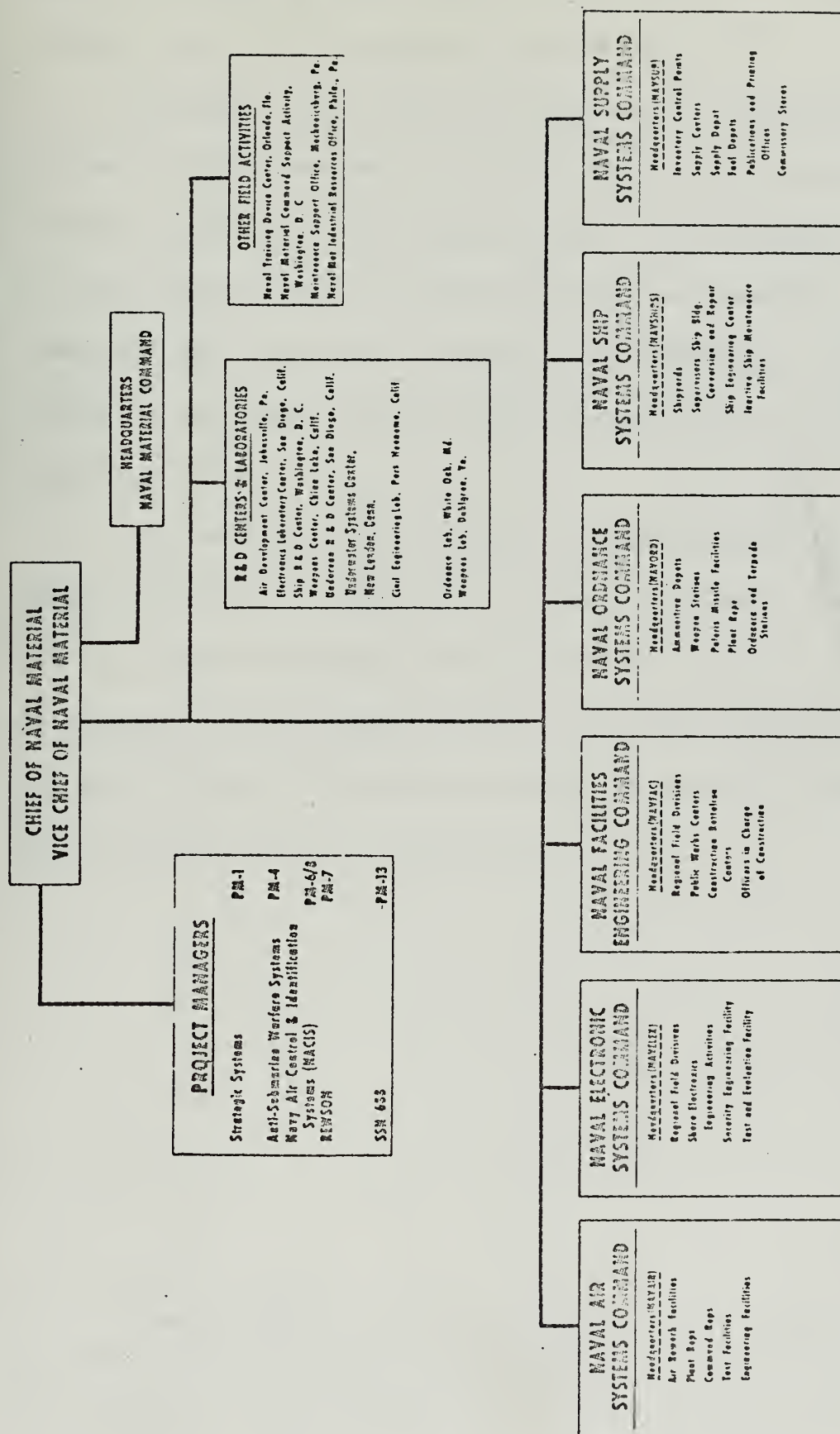


Fig. 4.--Naval Material Command Organization

Source: See Figure 1, p. 7.

level--in terms of many budgets and reports NMC acts as a "rubber stamp" in transporting the documents.⁵

Figures 5 and 6 show the Naval Air Systems Command and its Assistant Commanders. The 01 block is the division that contains the Naval Coordinated Project Offices (APC-255)--this is where the Assault Helicopter Office is located. The Deputy Commander for Plans and Programs, and Comptroller administers the RDT&E and PAMN Budgets and is responsible for the PAMN Appropriation.

The working relationships within the NavAir 01 area are shown on Figure 6. The point is that for Assault Helicopters (or all Navy Helicopters for that matter) there is no designated Project Manager--all come under the Naval Coordinated Project Offices and managers working on specific helicopters are called Deputy Project Coordinators.

⁵ Study of the Accounting System of the Department of the Navy, Haskins & Sells, Certified Public Accountants, Washington, D.C. Report number N00600-70-C-0565, published 11 September, 1970, Exhibit 13 A "Informal-Formal Relationships, Basic Problems."

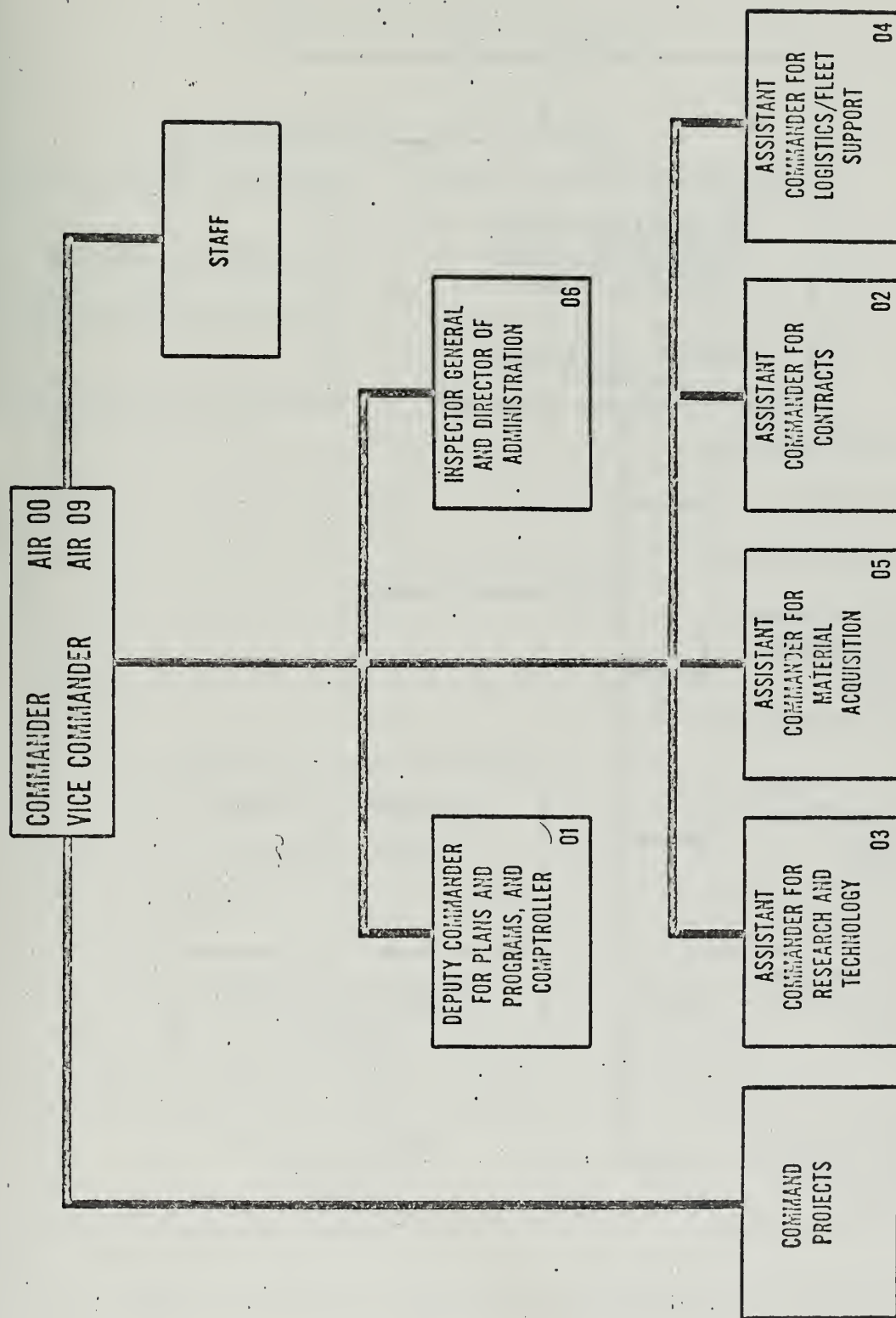


Fig. 5.--Naval Air Systems Command Headquarters Organization

Source: See Figure 1, p. 7.

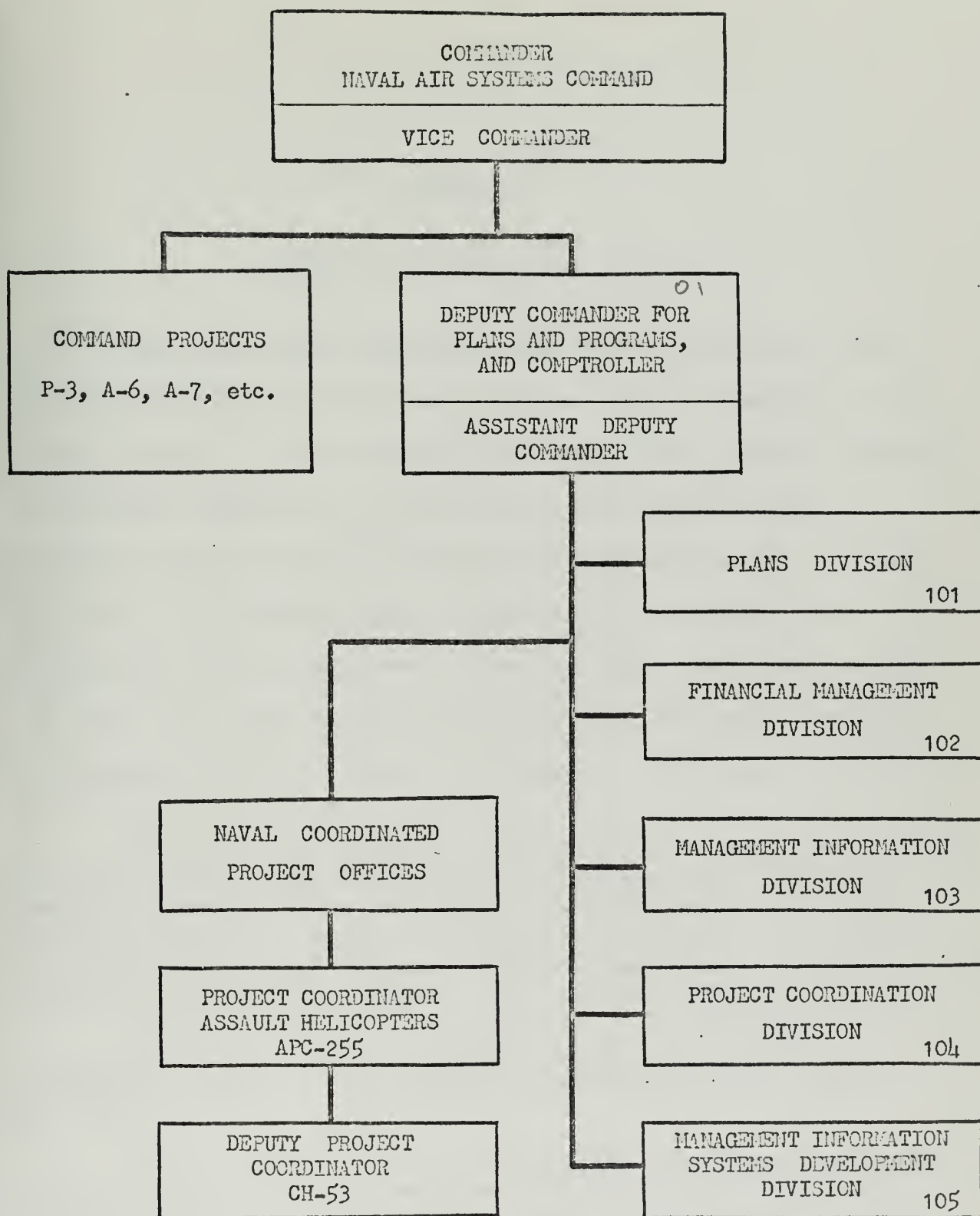


Fig. 6.--Deputy Commander for Plans and Programs,
and Comptroller Organization

CHAPTER II

CURRENT PPBS REVISIONS IN DOD

The Planning, Programming and Budgeting System began in the Department of Defense (DOD) in 1961.¹ Whether it came about because of Congressional pressure,² the growing complexity of Defense spending, the slow evolution suggested by Senator Jackson when he traced program budgeting " . . . back at least to President Taft's Commission on Economy and Efficiency, which published, 'The Need for a National Budget,' in 1912,"³ or even the impact of one man, the then Secretary of Defense (SecDef), Robert S. McNamara, its present existence

¹There are many sources which document this fact. One of the more concise was found to be the unpublished MBA thesis of Thomas R. Stuart, "The Impact of Budgeting Reforms and Their Historical Relationship to Planning, Programming, Budgeting in the Department of Defense" (George Washington University, Navy Financial Management Program, 1970), chapter iv, pp. 50-70.

²Charles J. Hitch, Decision-Making for Defense (Berkeley, Calif.: University of California Press, 1965), pp. 26-27.

³U.S., Congress, Senate, Planning-Programming-Budgeting, Hearings before the Subcommittee on National Security and International Operations of the Committee on Government Operations, 90th Cong., 1st sess., Part 1, 23 August, 1967, p. 12. (Hereinafter referred to as Planning-Programming-Budgeting Hearings.)

is the important fact. This chapter will review the most recent changes in PPBS and relate them to the Navy form of DOD PPBS.

The revisions were the result of a Defense Management Conference held in May, 1969. It was attended by the new DOD presidential appointees of the Nixon Administration which came into office in January, 1969. The conference was aimed at " . . . improving the DOD top-level decision-making process."⁴ The meshing of the recommendations of this conference, plus a Pentagon staff effort earlier the same year to simplify PPBS procedures, resulted in the revision to DOD Instruction 7045.7, entitled "The Planning, Programming, and Budgeting System." This is being used as the procedural basis for preparation of the FY 72-76 Defense Program and the FY 72 Budget.⁵

The stated aim of the conference pinpointed a basic problem area of PPB that developed in the years 1961 through 1967--in the words of the Jackson Subcommittee this was a period of "Greater centralization of decision-making and control."⁶ The opinion of observers during this period who had

⁴Laurence E. Olewine, "PPBS in Defense for the Seventies," Defense Industry Bulletin, VI, No. 5 (May, 1970), pp. 1-4.

⁵Ibid., p. 1.

⁶Planning-Programming-Budgeting Hearings, p. 14.

direct dealings with the Defense Department Staff was that decisions were made by the Secretary of Defense and his staff without regard to the advice of the heads of the military services, namely the Joint Chiefs of Staff (JCS).⁷ This fact was brought out on more than one occasion. A case in point was the F-111 which was not recommended by the JCS as an appropriate weapons system, but which the SecDef directed acquisition of anyway. Other problems that arose during this period because of centralized decision-making and control were Skybolt and " . . . a \$277 million oil-fueled aircraft carrier that was obsolete before it was launched,"⁸ to name just a few. The latter pointed to another weak area in the old PPBS and this was the lack of fiscal guidance in the early phases of the Planning portion of the system.

Perhaps the greatest difference and the one that resulted in the May, 1969, conference and subsequent PPBS revisions was the greater participative characteristic of the newly appointed

⁷ Opinions obtained through interviews with the following: Mr. Claude Witze, senior editor of Air Force and Space Digest and DOD observer for twenty years; Mr. Edward Speck, economist and PAMN Appropriation Budget Analyst for the Comptroller of the Navy for eight years; Mr. Thomas Jefferies, Deputy Project Coordinator for Helicopters, Naval Air Systems Command.

⁸ Planning-Programming-Budgeting Hearings, p. 13.

DOD staff.⁹ This point was made at a recent lecture by RADM Moore when he stated that Secretary Laird was much more of a participative manager than his once-removed successor, Robert S. McNamara.¹⁰ The participative approach can be seen throughout the revisions because the revisions themselves are directed towards more involvement on the part of all concerned to determine the best force mix and resource allocation to meet the security needs of the nation.

In the revision, four new documents have been added and three have been deleted. These are shown below:

Documents Added

Strategic Guidance Memorandum (SGM)
 Fiscal Guidance Memorandum (FGM)
 Joint Force Memorandum (JFM)
 Program Objective Memorandum (POM)

Documents Deleted

Draft Presidential Memorandums (DPM)
 Major Program Memorandums (MPM)
 Defense Guidance Memorandums (DGM)¹¹

⁹ Steven Lazarus, Commander, USN, "Defense PPBS--A 1969 Overview," Defense Industry Bulletin, V, No. 6 (June, 1969), 19-22.

¹⁰ Lecture by RADM S. H. Moore, Director of Budget and Reports, Comptroller of the Navy Office, given to Navy Financial Management Program Class of 1971, George Washington University on 16 November, 1970.

¹¹ Navy Logistics Management School, Navy Department Planning and Management Systems Course, The Programming System (Washington, D.C., 1970), p. 118.

The complete PPB Cycle is shown in Figure 7. The Roman numerals which indicate key points on the figure will be referenced in the following discussion of the cycle and changes thereto.

Planning

The cycle begins with the Joint Strategic Objectives Plan-I (JSOP-I) which is shown as numeral I on Figure 7. It is developed by the Joint Chiefs of Staff (JCS) and is the first of a three part plan. JSOP-I provides the advice of JCS to the President and SecDef on such matters as military strategy, force objectives and other associated recommendations for attaining the national security objective of the United States. The purpose of the plan, which covers two to ten years, is to provide a JCS statement of the national security objective and the military objectives derived therefrom.¹² Another document prepared by JCS for SecDef is the Joint Research and Development Objective Document (JRDOD) which provides advice concerning research and development objectives necessary to carry out the recommendations of the JSOP.¹³

¹²U.S., Department of Defense, Instruction Number 7045.7, "The Planning, Programming, and Budgeting System," 29 October, 1969, p. 3. (Hereinafter referred to as DODINST 7045.7.)

¹³Ibid.

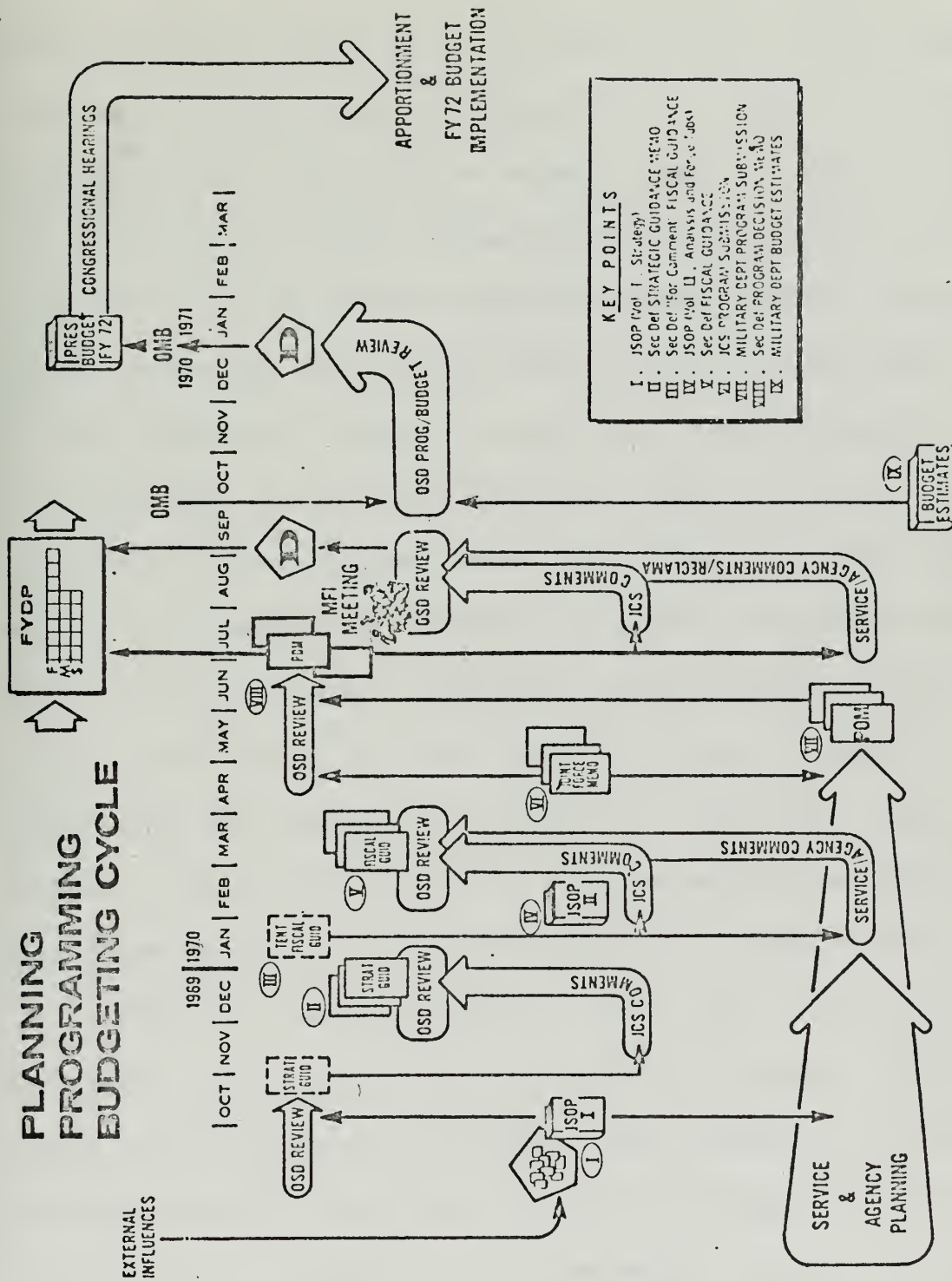


Fig. 7.--Planning Programming Budgeting Cycle

Source: Navy Logistics Management School, Navy Department Planning and Management Systems Course The Navy Planning System (Washington, D.C., 1970).

The Navy planning input to JSOP is through the Chief of Naval Operations (CNO) who is a member of JCS. It is based upon various studies the most important of which is the Navy Strategic Study (NSS) and its annexes A and B. Annex A deals with mid-range strategic guidance and projects qualitative force and research and development guidance for the five-year period commencing five years after the end of the fiscal year in which approved. Annex B accomplishes the same except it is for long-range planning and guidance, hence it is for the ten-year period commencing ten years after the end of the fiscal year in which approved. The NSS and annexes summarize the Navy's roles and tasks. Mid-range and long-range objectives are developed based upon the complete NSS and on further studies and analyses of the prospective naval task requirements, threats, technological potentials and resource availability.¹⁴ This forms the basis for the Navy planning input to JSOP-I.

Referring again to Figure 7, the JSOP-I is sent to the SecDef for review and to the services for planning. After the Office of the Secretary of Defense (OSD) review, a tentative Strategic Guidance Memorandum (SGM) is developed and sent to JCS for comment. Since this new document is based on JSOP-I, it incorporates much of the Plan, but also reflects any

¹⁴Navy Programming Manual, OPNAV 90P-1C, January, 1969, pp. 3-2 and 3-3.

modifications or additional strategy guidance deemed necessary by the SecDef. Once the Strategic Guidance Memorandum (SGM) has been reviewed by JCS and their comments considered, the SecDef issues a revised SGM (numeral II on Figure 7) to JCS, the military departments and defense agencies early in January. The goal of the issuance of the revised SGM is to provide current and completely coordinated strategy guidance for the entire defense community.

A chart for processing PPBS documents within the Navy is shown in Figure 8 and will be used throughout the discussion to clarify the flow of documents and to categorize the steps shown in Figure 7 into their appropriate PPBS phases.

After the SGM has been distributed, the second new PPBS document is issued and this is the tentative Fiscal Guidance Memorandum (FGM) (numeral III). A major departure from the old PPB and a significant revision in its own right, the purpose for it is made quite clear in the order:

Annually, the SecDef will issue tentative five year guidance to define the total financial constraints within which the DOD force structure will be developed and reviewed . . . SecDef will specify in the FGM the nature of the fiscal planning constraints, and the assumptions used in its preparation.¹⁵

Introducing fiscal constraints near the beginning of the PPB Cycle forces consideration by everyone concerned of

¹⁵DODINST 7045.7, pp. 6-7.

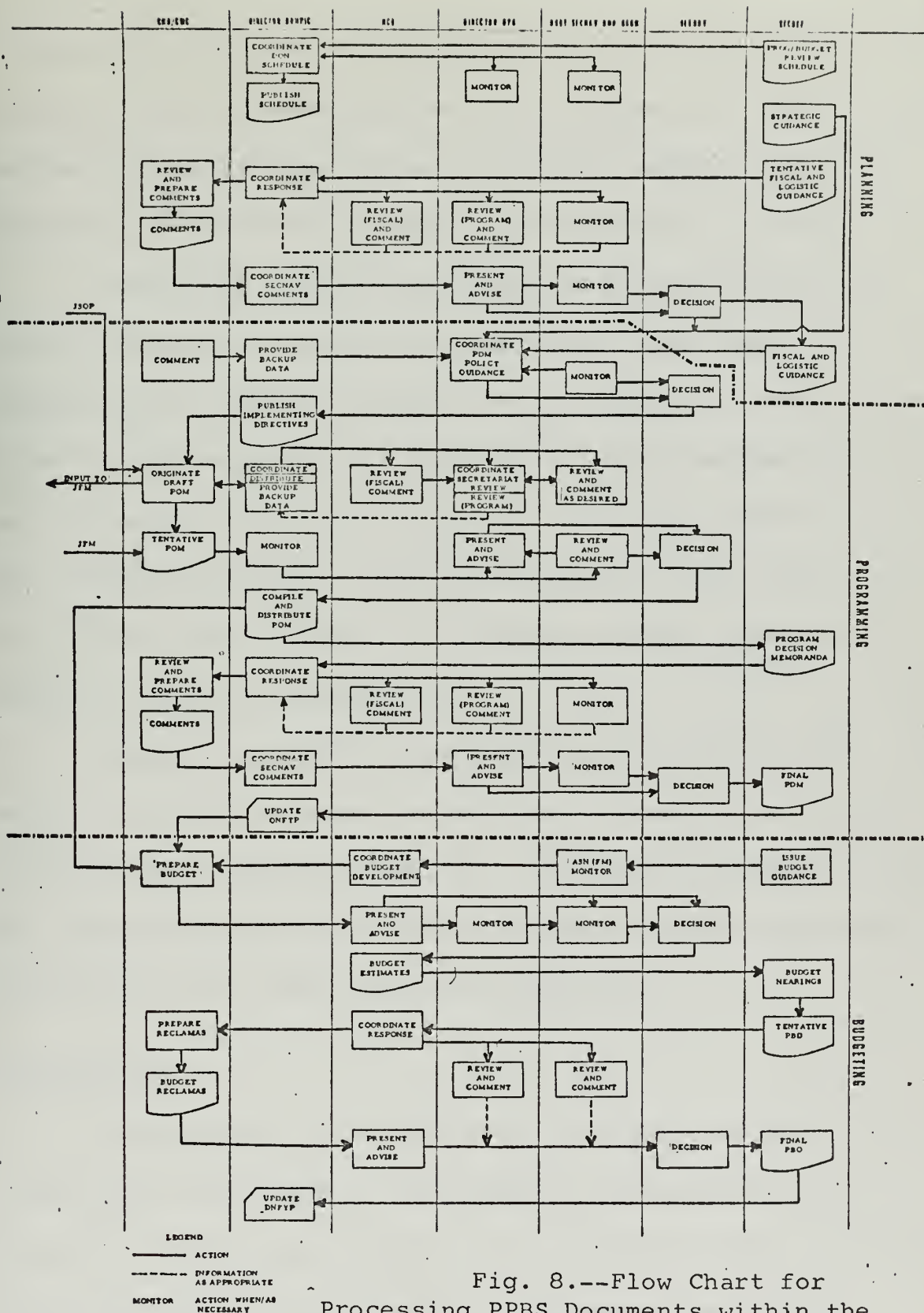


Fig. 8.--Flow Chart for Processing PPBS Documents within the Department of the Navy.

Source: U.S. Department of the Navy, Policy, Roles and Responsibilities within the Department of the Navy for Implementation of the DOD Planning, Programming and Budgeting System (PPBS). Secretary of the Navy Instruction 5000.16D, 8 January, 1970.

alternatives and priorities throughout the entire process. The effect of this document on the Navy is shown in Figure 8 by the review of both CNO and CMC and subsequent approval by the Secretary of the Navy (SecNav) and submission to SecDef.

During the period when tentative fiscal guidance is being reviewed by the military departments and agencies, JCS is completing the JSOP-II (numeral IV in Figure 7). This is the force structure portion of JSOP and provides recommendations, as well as the associated rationale, on forces needed to meet the strategy guidance. It is significant to note that as in the old PPB Cycle, JSOP-II is prepared without regard to specific financial constraints.

Receipt by SecDef of the JSOP-II from JCS and the tentative fiscal guidance review from JCS and the services concludes the Planning Phase (V). As shown in Figures 7 and 8, the publication of JSOP-II and the Fiscal Guidance Memorandum initiate the next PPBS Phase--Programming.

Programming

Programming in the PPBS Cycle is the process of translating force and support requirements into manpower and material resource requirements. It is based on the Five Year Defense Program (FYDP)¹⁶ which is structured as follows:

¹⁶ A Managers Guide to the Acquisition of DOD Systems and Equipment, published by the Logistics Management Institute,

TABLE 3

MAJOR FYDP PROGRAMS

-
- I Strategic Forces
 - II General Purpose Forces
 - III Intelligence and Communications
 - IV Airlift and Sealift
 - V Reserve and Guard Forces
 - VI Research and Development
 - VII Central Supply and Maintenance
 - VIII Training, Medical and Other
 - IX Administration and Associated Activities
 - 0 Support of Other Nations
-

Source: Navy Logistics Management School, Navy Department Planning and Management Systems Course, The Programming System (Washington, D.C., 1970), p. 95.

The FYDP is the summation of the approved programs of all DOD components and consists of resource inputs and military outputs. A basic unit of the FYDP is the Program Element which is defined as:

defines FYDP as follows: An eight-year projection of forces and a five-year projection of costs and manpower arranged in mission-oriented program packages. The FYDP projects approved programs for the current fiscal year, the base year, and the succeeding four fiscal years. Changes to the FYDP program which result in changes of forces, total obligational authority, or personnel assignments to individual programs are made by submitting a Program Change Request (PCR). LMI Task 68-13, Washington, D.C., January, 1969, p. 22.

A description of a mission by the identification of the organizational entities and resources needed to perform the assigned mission. Resources consist of forces, manpower, material quantities, and costs, as applicable.¹⁷

The forces, dollars, manpower and description of each program element are displayed in the FYDP. The purpose of the program element is to aggregate these units most meaningfully and conveniently for top level decision-making. All program elements taken together constitute the complete defense establishment.

Publication of the JSOP-II and the Fiscal Guidance Memorandum (FGM) (IV and V in Figure 7) in February and March of each year, respectively, sets the stage for the third new document, the JCS Joint Force Memorandum (JFM). The JFM is issued in April and presents force level and support program proposals in a format similar to JSOP-II, but the JCS recommendations have to be reworked to reflect the fiscal constraints of the JSOP-II recommendations, the JFM will contain JCS assessment of risks associated with reducing the JSOP-II recommended forces to meet fiscal constraints. Since risk assessment in the JFM considers the strategy and objectives of the Strategic Guidance Memorandum and Parts I and II of the JSOP, it serves to highlight major force issues that must be resolved during the year. These force issues are taken into consideration when

¹⁷ DODINST 7045.7, p. 3.

copies of the Joint Force Memorandum are distributed to OSD for review and to the military departments and defense agencies for further guidance in their planning activities (VI in Figure 7).

The JFM exerts considerable influence in determining force levels and priorities and illustrates the more active role of the JCS in developing the FYDP--more active than was the case in recent years.¹⁸

While the JCS play a considerable role in the revised procedures, there is also a major increase in tasks and responsibilities of the military departments and defense agencies. In May of each year, each of these components submits a Program Objective Memorandum (POM) to OSD for review (III in Figure 7).¹⁹ The POM is a comprehensive and detailed presentation of the forces and manpower proposed by each military department and defense agency within the constraints of the Fiscal Guidance Memorandum. The POM's reflect the strategy and objectives of the previously discussed inputs (JSOP-I, JSOP-II, SGM, FGM, and JFM) as well as an assessment of risks

¹⁸DODINST 7045.7, pp. 5-12, and The Programming System, p. 118.

¹⁹The POM is the fourth new document and is defined as follows: A memorandum in prescribed format submitted to SecDef by the Secretary of a military department or the Director of a defense agency which recommends the total requirements within the parameters of the published SecDef fiscal guidance. DODINST 7045.7, p. 4.

resulting from any deviation which a military department feels may arise by conformance to the above plans and memoranda.

Since the POM proposes a total military department or defense agency program in terms of forces, manpower and costs, it is necessary to assemble all the requirements for early examination and to have decision-making or formulation of practical alternatives and recommendations, at the sponsor/program coordination levels.²⁰ Once this has been accomplished and the department or agency program objectives have been defined, the POM is submitted to OSD. The Navy POM, when completed, accomplishes two essential goals:

1. It provides orderly processes for establishing the Department of the Navy position on forces.
2. It provides early completion of the main framework on the Navy's Budget Estimate.

The POM corresponds to the Draft Presidential Memorandum (DPM) of the previous PPB procedure, however it represents one of the major PPBS revisions. The difference is that instead of having initial analysis and presentation of alternatives presented by OSD, as was the situation noted earlier about the McNamara approach to decision-making and control, the POM is initiated exclusively by a military department or defense agency

and then submitted to SecDef and his staff. This change of events is described by Mr. Olewine as follows:

This is a highly significant turn of events. It places the burden of detailed initial force planning and tradeoff analysis with the military services and defense agencies, which represents a considerable deviation from the previous procedures.²¹

Based upon a review of the individual POM's by the SecDef, a series of Program Decision Memoranda are issued to reflect the Secretary's program decisions (VIII in Figure 7). These Program Decision Memoranda (PDM) are to be completed by the end of July each year, however, there is provision for DOD components to express a dissenting view to any of the PDM's. If this occurs, SecDef will direct appropriate staff reviews of any documented dissenting views and any new decisions resulting from such review will be reflected in modified POM's. These reviews are scheduled to take place during the month of August each year and would coincide with the meeting between the JCS and service secretaries, and SecDef to discuss and resolve any remaining major force issues. The meeting, or series of meetings, result in the Final PDM to be reflected in an updated FYDP. In the case of the Navy, this is shown in Figure 8 as the DNFYP (Department of the Navy Five Year Program)--in either case, the update has occurred and it remains to fit the budget to the scope and dimension of the FYDP/DNFYP.

²¹Olewine, "PPBS in Defense for the Seventies," p. 3.

Budgeting

The budget cycle in the past was such that grass roots preparation began long before definitive guidance was available for the budget year. Because of the lack of fiscal guidance, a large part of the PPB cycle was spent working on plans with total costs in excess of finally approved budgets. This necessitated frequently frantic budget trimming from October to December on a program that took nine months to structure (see Figure 7). Under the revised system, it is expected that budget submission will be within the constraints of the FGM and the October-December time frame will be used for fine-tuning.²² In order to conform to the FGM constraints, it appears that the emphasis will be on a more analytical budget preparation by each service department. The implication here is that each military department and defense agency will revise its own budget preparation procedures--as was the case with the Department of the Navy when it hired the accounting firm of Haskins and Sells to undertake a five year study of its accounting system.²³ A complete analysis of the firm's first two reports is not within the scope of this study, nor will procurement

²²Ibid., p. 4.

²³Lecture by ADM Lescara, Deputy Comptroller of the Navy, Office of the Comptroller of the Navy, given to Navy Financial Management Program Class of 1971, George Washington University on 9 November, 1970.

accounting be discussed, however, matters pertaining to possible budget revisions will be discussed as they relate to the Research, Development, Testing & Evaluation (RDT&E) and Procurement Aircraft and Missiles, Navy (PAMN) Appropriations.

A review of the Budgeting Phase on Figure 8 illustrates the process as it now exists with Budget Guidance coming from SecDef and going to the two military services in the Department of the Navy. Command relationships and Budget responsibility were shown in the Introduction--here it is only important to remember that the Comptroller of the Navy (NAVCOMPT) has the responsibility for overall coordination of budget and fiscal matters related to the programs of both services (USN and USMC).

Budget Guidance from SecDef is issued through the Assistant Secretary of the Navy(Financial Management) (ASN(FM)) to the NAVCOMPT(Budget) (NCB) which coordinates the budget development in order to shape estimates into a tentative overall Departmental Budget with clear delineation of significant problems which require further consideration and discussion at higher levels within the Department.

The Navy and Marine Corps prepare their budgets and present them to NCB--these are monitored by the Director, Office of Program Appraisal (OPA) and the ASN(FM). Generally speaking, significant differences which cannot be reconciled

between the NCB staff and the officials from the component commands are referred to the CNO Advisory Board (CAB),²⁴ with major policy questions still outstanding being referred to either the CNO or CMC. If differences still exist, the SecNav makes the final decision.

The various budgets are then presented to SecNav who decides upon the Departmental Budget. Once approved by SecNav, NCB prepares the overall Budget Estimates and these are presented to SecDef at the Budget Hearings. The Budget Estimates (IX on Figure 7) are reviewed by Office of Management and Budget (OMB) and OSD and once a tentative Program Budget Decision (PBD) is made, the NCB coordinates reklamas and presents these to SecNav for decision. SecNav in turn presents the Budget to SecDef for Final PBD. Once approved, the FYDP/DNFYP are updated and the Departmental Budget becomes a part of the Presidential Budget which is submitted to the Congress.

Congressional approval initiates the Budget Execution Phase for the Navy. The development of operating budgets and apportionment data is undertaken by the organizations which are

²⁴The CNO Advisory Board was created by CNO to ensure that top military personnel consider the Navy's program decisions and their budgetary and manpower implications. It consists of: Vice CNO, six Deputy CNO's, the CNM, Assistant Vice CNO(Admin), DepComptroller, CMC representative and the Director, Navy Program Planning. RADM W. D. Gaddis, "Budget Process in the Department of the Navy," Armed Forces Comptroller, April, 1969, p. 34.

responsible for the various appropriations, as well as by their component commands or activities, prior to receipt by NAVCOMPT of specific guidance from the AsstSecDef(Comptroller).

The SecNav has assigned the responsibility for allocation of funds and administration of apportionments to NAVCOMPT who in turn allocates funds to CNO, CMC, ASN(R&D) and to the Naval Material Command (NMC), each of whom is required to exercise effective control of financial operations within established procedures and systems. The process of distributing financial authority, and the accompanying responsibility for control, accounting, and reporting, is continued through the chain of command in the form of suballocation allotments, operating budgets or operating targets.²⁵ In the case of the Naval Air Systems Command (NavAir), the Deputy Commander for Plans and Programs, and Comptroller administers the budget for RDT&E and PAMN Appropriations.

The reprogramming or reallocation of available funds in the Navy is dependent upon established thresholds which determine the level of required approval. Once approved, reprogramming documents become authorization for adjustment to the base program as reported to the Congress and documented semi-annually in the report of programs. These reports of

²⁵ Ibid., pp. 35-36.

progress then become a record of program execution in response to the appropriations act.

The time scope of the complete budget cycle covers three or more years, so that at least three annual programs are being dealt with at all times.

Since NAVCOMPT/NCB plays such a key role throughout the budgeting process, any revision of present budgeting procedures will start with them and center around those areas that make conformance to FGM constraints difficult. One major area requiring revision is the decentralization of responsibility that exists in terms of appropriations.

Because of the "grass roots" approach to budgeting which is still used, various organizational units direct different phases of budget formulation and execution continuously--as noted earlier, in any one year three different FY budgets are being worked on. This decentralization has fragmented authority and responsibility and has contributed to the inability of the system to accomplish budget formulation and execution effectively and efficiently, further, it resulted in the establishment of informal relationships and responsibilities which were viewed by the Haskins and Sells study as follows:

Such informal relationships are not conducive to required coordination of activity and they contribute to duplication of effort, particularly in the review phase of budget formulation. Overlapping reviews exist

at many levels, but primarily between NAVCOMPT and CNO. These overlapping reviews provide opportunities to avoid fixing responsibility.²⁶

Another area requiring revision is in the correlation of FYDP/DNFYP and Appropriation Structures. The problem is to formulate a budget where preparation is on one basis and Congressional approval is on another. The Navy has accomplished this correlation in several areas, however, in the PAMN type funds this has not been done. The translation of program oriented plans into traditional appropriation terms for Congressional presentation has resulted in the existence of many different concepts, terms and reconciliations, and has caused compromises to be made so that the two would be more compatible. Although the FYDP and Appropriation structures relate to some degree, " . . . it is frequently difficult to respond to additional requests for detailed information on an accurate and timely basis."²⁷

In line with the above is the problem with the Navy Cost Information System (NCIS) which was established to provide a set of uniform data to be used within the Navy for planning,

²⁶ Study of the Accounting System of the Department of the Navy, Haskins & Sells, Certified Public Accountants, Washington, D.C. This is the first report submitted to the Navy. It is report number N00600-70-C-0565 and was published 11 September, 1970, p. 161.

²⁷ Ibid., p. 171.

programming and budgeting appraisal.²⁸ Its objective is to translate the Navy's appropriation structure to the FYDP structure. The system is considered NAVCOMPT's general purpose financial management information system, consolidating the Navy's approved cost and defense program changes into an automated data file. The great potential value of NCIS²⁹ is not being realized because presently it is updated on an irregular basis and certified obligations are entered only once a year. Any NAVCOMPT budgeting revisions will have to consider updating NCIS input procedures if its full utilization is to be obtained.³⁰

No budget procedure revisions have come from NAVCOMPT for two reasons:

1. The full implications of the new PPB system have not been fully recognized. The FY 72 Budget was the first submitted under the new system and this took place just three

²⁸Programming Manual, p. D-8.

²⁹The Haskins & Sells report evaluated NCIS as follows: "This Data Bank is reported to be the only place in the Navy that brings together the appropriation and FYDP structures moneys, with manpower, and materials (weapons systems and equipment). To this extent, and with the knowledge that the data are reasonably accurate, this historical data file should serve a useful purpose to top-level Navy managers for analyses as well as for future planning and programming," p. 172.

³⁰Ibid.

months ago--it is still too early to evaluate the changes and what effect they have had.³¹

2. The study pinpointing the various problem areas was published less than eight months ago, to review and evaluate all of its recommendations requires a great deal of time and staffing.

Unlike the areas of Planning and Programming, there are no concrete revisions that can be pointed out in Budgeting--what can be shown is the fact that the pressure of fiscal constraint conformance has caused one military department to re-evaluate its efforts in this area. It is felt that the re-evaluation will ultimately result in revised budgeting procedures.

³¹Lecture by VADM Bell, Director, Navy Program Planning, Office of the Chief of Naval Operations, given to Navy Financial Management Program Class of 1971, George Washington University on 14 December, 1970.

CHAPTER III

PROCUREMENT CONTRACTS AND DOD REVISIONS AFFECTING THEM

There are many types of military procurement contracts in use and each has its own characteristics. In order to reduce the overall number of contracts for discussion, this chapter will cover only those most frequently used and preferred by the Department of Defense (DOD) in aircraft procurement. The advantages and disadvantages of each will be reviewed and will serve as a lead-in to the next point of discussion--the actual weapon system acquisition procedure as applied in the Navy during the 1969-1970 time period and based upon DOD policy and PPBS. After discussion of the acquisition process, recent policy changes related to contracting will be reviewed. The chapter will conclude with examination of the factors which brought about the policy changes.

A study in 1968 by the Weapon Systems Group of the Aerospace Industries Association listed nine different types of contracts authorized by the Armed Services Procurement

Regulation (ASPR) Section 3, Part 4.¹ Of the nine, three are described here in their order of DOD preference:

1. Firm Fixed Price (FFP)
2. Fixed Price Incentive Fee (FPI)
3. Cost Plus Incentive Fee (CPIF)²

In terms of the foregoing chapter on Planning-Programming-Budgeting (PPBS), a benefit of this preference listing may stem from the fact that the Defense Budgeting Cycle is long and in past planning there was no fiscal constraint in the budgeting cycle. The fact that a set figure could be established early in a long budget preparation cycle appears to have made some form of fixed price contracts at least easier to work with during the year and one half period when the military service department budget was being formulated. Fiscal guidance, now present in the Planning Phase of PPBS

¹Weapon Systems Development Group, Aerospace Technical Council and Procurement and Finance Committee, Phase II Report, "Essential Technical Steps and Related Uncertainties in DOD Weapon Systems Development" (Washington, D.C.: Aerospace Industries Association, September, 1968), Appendix A, pp. 3-5. (Hereinafter referred to as Weapon Systems Development Group.)

²This preference is stated: "The precision with which performance can be defined will largely determine the type of contract employed, with Firm Fixed Price Contracts receiving first consideration. . . . In all major system developments, and in other development programs where the use of cost and performance incentives are considered administratively practicable, Fixed Price Incentive and Cost Plus Incentive contracts are to be considered in that order." Armed Services Procurement Regulation, Section 3, Part 4, Paragraph 403(c). (Hereinafter referred to as ASPR.)

(through the Fiscal Guidance Memorandum--FGM) also makes it highly desirable to be able to plan an acquisition based upon a firm early dollar figure.

The above three types of contracts will be discussed based upon the viewpoint of the Development Group Study and the preference policy of the ASPR up to the time of the appointment of Secretary Laird and Deputy Secretary Packard. It is felt that though the order of contract preference may change, the overall advantages and disadvantages of each to both parties (government and industry) will remain essentially the same.

Critical to the success of the FFP contract is whether a fair and reasonable price has been established at the outset. The price is based upon such conditions as definite design or performance specifications, realistic estimates, adequate competition, reasonable price comparison and reasonable allocation of risks. Proper consideration of these factors can be the key to FFP effectiveness.

When applicable, FFP is most advantageous to the government because it shifts risk and responsibility to the contractor and requires much less administration. It tends to reinforce the budgeting process because a fixed amount is established. It is disadvantageous to the government because of the following factors: (a) the price must contain some contingencies, (b) there is no in-process control of work, (c) there is less

visibility of cost data, and (d) a complete formality is required for any changes. Additionally, the contract presupposes a presolution of any design problems.

FFP advantages on the contractor side include the potential for higher profit, minimum governmental control, well-defined specifications, better cost estimates, and less financial audit. The disadvantages can be summed up in two points: total risk assumption and non-acceptance by the government of cost contingencies.

The next contract, Fixed Price Incentive (FPI) was recommended by the ASPR when the FFP contract was inappropriate (inadequate design or performance specifications are not available, etc.) and when " . . . supplies are such that contractor cost risk provide a profit incentive to control cost and performance."³ The factors needing consideration in this choice of contract are: (a) that the least costly method must be determined and (b) that the procurement effort may be impractical if any other contract type is employed. The ASPR indicated that FPI was to be used for less complex systems or production contracts where cost incentives existed and where there was a possibility of cost reduction and/or performance

³ Weapon Systems Development Group, Appendix A, p. 3.

improvements by giving the contractor either a degree of cost responsibility and/or a positive profit incentive.⁴

Governmental advantages of the FPI contract are that it spreads risk, has less reason for price contingencies, encourages and incentivizes efficiency, and makes the contractor responsible for management. Disadvantages would be that, as with FFP, no ceiling on profit could be imposed thus requiring that a budget for the contract be based upon the contract ceiling price, increased administrative costs, minimum control of work in process, and complex contract negotiations. Technical difficulties might arise because FPI precludes technical direction and limits innovation.⁵

FPI advantages to the contractor would include the potential for a higher profit because of the greater risk involved, good management would be rewarded, and there would be less governmental control. The disadvantages that might result would be a price ceiling, detailed accounting records, government verification of costs, and also complex negotiations.

The least preferred of the three contract types mentioned is Cost Plus Incentive Fee (CPIF). The ASPR considered it suitable in the development and test phase when " . . . a cost-reimbursement type of contract is found necessary . . .

⁴ASPR, Section 3, Part 4, Paragraph 404.4.

⁵Weapon Systems Development Group, Appendix A, p. 3.

and when a target and a fee adjustment formula can be negotiated which are likely to provide the contractor with a positive profit incentive for effective management."⁶

CPIF governmental advantages include providing motivation for cost-effectiveness through a bonus/penalty arrangement, share of in-process control of work, and cost visibility. On the disadvantage side, CPIF can bring about overrun costs, high administrative costs, complex negotiations, high risks, and the reduced opportunity to manage.

The advantages of CPIF to the contractor are the limited risk, possibility of an increased fee, assurance of recovering costs, and the reward for good management. Disadvantages might include reduced fees because of the reduced risk, an absolute limit on the fee, disallowance of certain normal business costs, more government engagement, and complex negotiations. Additionally, there would be the ASPR XV audit.⁷

The selection of an appropriate procurement contract which is equitable to both sides and which results in a successful acquisition is based upon many factors. The introduction of fiscal guidance in the early PPBS Phases was shown to have a decided influence upon planning and programming. This fact plus the point made earlier about a reduction in

⁶ASPR, Section 3, Part 4, Paragraph 405.4(b).

⁷Weapon Systems Development Group, Appendix A, p. 10.

defense spending makes contract selection an important consideration in any acquisition process. In addition, the order of contract preference has changed somewhat and the changes as they relate to the three types mentioned will be discussed later in the chapter.

The PPBS Cycle in Chapter II developed a Program Objective for each military department. Implicit in the cycle was the planning, programming, and budgeting required for each Program Element to enable it to attain its portion of the overall military department Program Objective. Once the mission of a Program Element was established during the Programming Phase, the essentiality for it to successfully accomplish its assigned mission may have required a new or improved weapon system.

The process whereby a new weapon is presently acquired is illustrated in Figure 9--the point here is that the development and subsequent acquisition of any major weapon system:⁸

(a) proceeds through several phases/stages, (b) involves a long period of time, and (c) requires the use of different

⁸"A major weapon system is one in which the cumulative RDT&E cost is estimated to be in excess of twenty-five million dollars or for those systems for which production inventory costs are expected to exceed one hundred million dollars." Chief of Naval Operations Instruction (OPNAVINST) 3900.8C, OP-701, Serial 64P70, January, 1966, "Planning Procedures for the Navy Research, Development, Test and Evaluation (RDT&E) Program," pp. 7-8. (Hereinafter referred to as OPNAVINST 3900.8C).

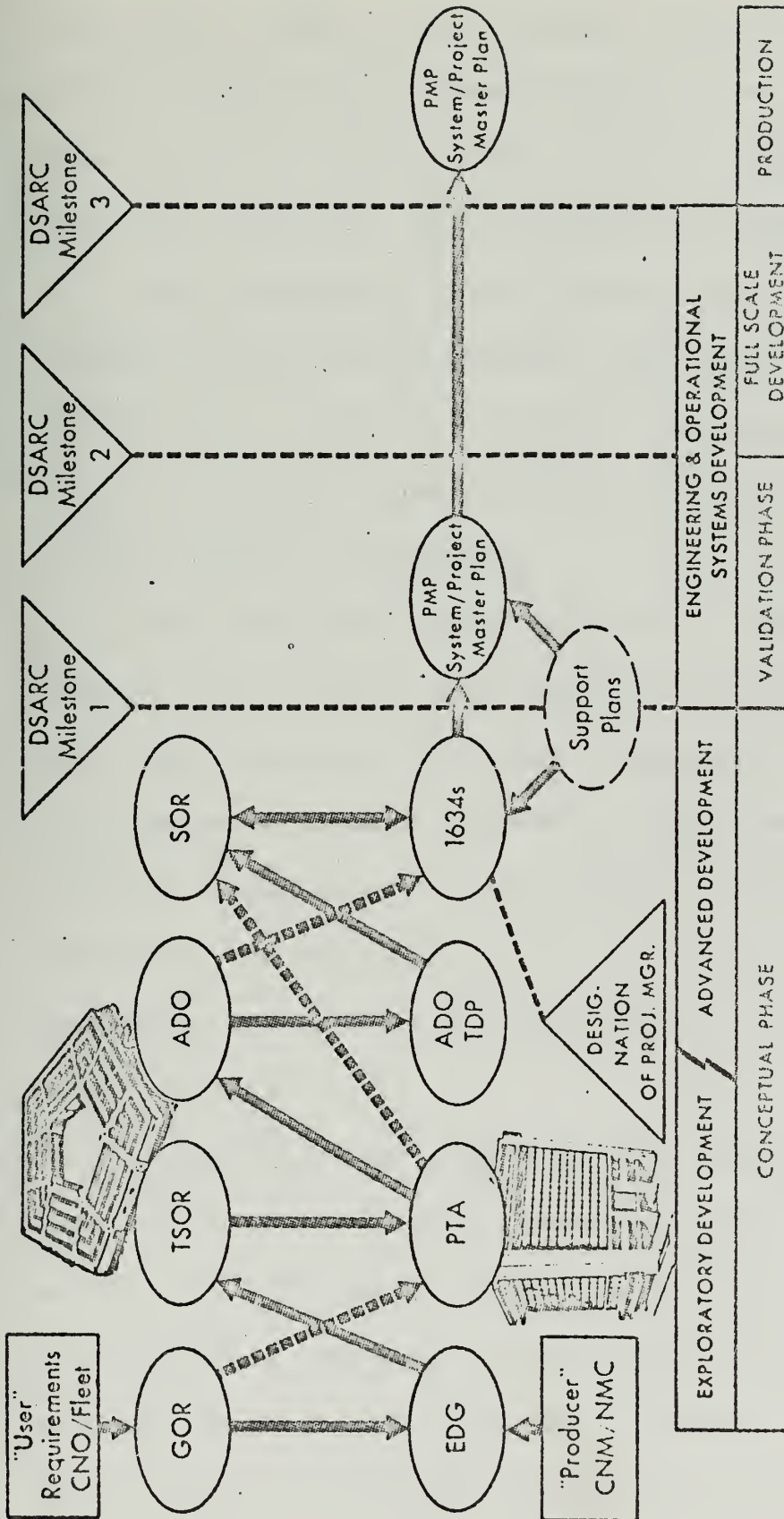


Fig. 9.--Department of the Navy Systems Planning

Source: Navy Logistics Management School, Weapons Systems Acquisition Course, Weapon Systems Acquisition (Washington, D.C., 1971).

appropriations (see "Time in each stage" and "FUNDING" in Figure 10). These factors suggest the applicability of different contracts for different phases. An example of this is shown in Table 4 which compares contract applicability to a particular phase and cites the ASPR reference in each case.

The references cited in Table 4 are the same as those used in the previous discussion about contract advantages and disadvantages. The table is shown to illustrate the applicability of contract types as listed in the ASPR that stated the earlier contract preference.

The use of the terms "contracts" and "appropriations" connotes that formalized procedures exist, for this reason some understanding of the actual acquisition process as it now exists must be present in order to gauge the impact any recent or future changes have on the process. Based upon this reasoning, the following will describe aircraft acquisition procedures now used by the Navy and will highlight recent DOD policy changes.

Acquisition of a major aircraft weapon system in the Navy begins with a General Operational Requirement (GOR) from a "User" (see Figure 9) to a Program Sponsor (DCNO(Air)). The GOR is a broad statement of objectives and goals for further operational capabilities needed in a major warfare or support area to meet the estimated threat of the five to ten year period.

**MAJOR WEAPON SYSTEMS PROGRAM
STAGES OF DEVELOPMENT AND PROCUREMENT**

Project Stage	Preacquisition		Acquisition	
	Concept Formulation Identify Program Objectives - Conditional Approval, Development Plans	Contract Definition Develop Firm Specifications - Approval to Proceed	Engineering Development Develop and Test Parts of Weapons Systems	Production Produce Planned Volume
FUNDING	RETURN	RETURN	RETURN, PART, SON, OPN, PNC	PART, SON, OPN, PNC
Activities Performed	System Concept		System Design	
	System Definition		System Development	
FACTORS THAT MAY CAUSE COST GROWTH	<ul style="list-style-type: none"> Define system operational requirements .. Speed .. Payload .. Strike capability 	<ul style="list-style-type: none"> Define design approach Define subsystems required 	<ul style="list-style-type: none"> Develop prototypes .. Soft tooling .. Combined sub-systems Review design requirements, as necessary 	<ul style="list-style-type: none"> Hard tooling Establish production level
	<ul style="list-style-type: none"> High performance requirements Revisions to requirements Concept formulation pricing underestimates cost to attain approval to proceed 	<ul style="list-style-type: none"> Revisions to requirements Increased equipment and material requirements to attain performance Conclusion of phase prior to system definition 	<ul style="list-style-type: none"> Revisions to requirements Increased equipment requirements to attain performance Modification of prototypes Underestimating contract price 	<ul style="list-style-type: none"> High tool up cost Inflation .. Material .. Labor Quantity changes
DEFENSE SYSTEM ACQUISITION Review Council (DSARC)	Performance Baseline Established *	Technical Baseline Established *	Technical Baseline Established *	Product Baseline Established *
each stage	1-5 years	5 months	2-4 years	10-15 years

**Fig. 10.--Department of the Navy--Major Weapon Systems Program--
Stages of Development and Procurement**

Source: Haskins and Sells, Public Accountants, Contract Number
N00600-70-C-0565, 11 September, 1970.

TABLE 4

APPLICABILITY OF CONTRACT TYPES

Contract Type	Engineering and Operational Development Phase	Initial Production Phase	Follow-On Production Phase
FFP	Not Applicable 3-404.2(b)	Applicable 3-404.2(b)	Applicable 3-404.2(b)
FPI	Applicable 3-404.4(b) 3-803(a)	May be applicable if FFP inappropriate and positive profit incentive can be negotiated. 3-404.4(b) 3-803(a)	May be applicable if FFP inappropriate and positive profit incentive can be negotiated. 3-407.2(b) 3-803(a)
CPIF	Applicable 3-405.4(b)	Not Applicable 3-405.1(b) 3-405.4(b)	Not Applicable 3-405.1(b) 3-405.4(b)

Source: Weapon Systems Development Group, Aerospace Technical Council and Procurement and Finance Committee, Phase II Report, "Essential Technical Steps and Related Uncertainties in DOD Weapon Systems Development" (Washington, D.C.: Aerospace Industries Association, September, 1968), Appendix A, pp. 7-8 (Figure 2).

It coincides with the NSS Annexes and provides guidance to the technical community for up-dating the technology necessary to support future warfare systems development. In addition to initiating the Conceptual Phase (Figure 9), or Concept Formulation Stage (Figure 10), the GOR is also an invitation to the Naval Material Command (NMC) to submit Proposed Technical Approaches (PTA) for achieving needed future capabilities when the necessary support technology becomes available.⁹

Based upon the requirements set forth in the GOR, DCNO(Development) sets forth Exploratory Development Goals (EDG, Figure 9) on a technical basis for investigations, feasibility studies, experimental efforts and for the minor development required to advance technology in various functional areas. EDG's are a follow-on of the GOR and serve to define the nature of the requirement more fully. Once the goals have been analyzed, a Tentative Specific Operational Requirement (TSOR) is prepared by DCNO(Air) and sent to the

⁹ Navy Programming Manual, OPNAV 90P-1C, January, 1969, pp. D-7 to D-10 defines: PROGRAM SPONSOR--the DCNO who has been designated as responsible for determining program objectives, time-phasing, and support requirements, and for appraising progress, readiness and military worth of specific programs. PROGRAM ELEMENT SPONSOR--DCNO who is responsible for force composition, funding support, and programmed manpower for a specific Program Element. He is responsible for objectives and planned programs for the out-years, as well as for the development of Program Change Requests. DCNO(Air) is the Program Element Sponsor.

Naval Air Systems Command (NavAir) via NMC. A TSOR is a set of requirements and is the initial step in the formal exchange of documents between the planner DCNO(Air) and the executor (NavAir) in the RDT&E planning cycle. Since it is the first step toward arriving at an aircraft definition, it includes procurement, operation and maintenance costs and tentatively states the requirement for a particular capability, identifies the anticipated threat, outlines operational concepts by defining those performance and operational characteristics which can be specified, and indicates the time period in which the aircraft is needed.¹⁰ It is important to note that promulgation of a TSOR by DCNO does not establish a firm requirement, nor does it authorize commencing a new development program.

NavAir responds to the TSOR in the form of Proposed Technical Approaches (PTA) which present CNO with different alternatives and provide the technical information upon which to base a decision for further development. The information includes an appraisal of the technical risk involved for the several approaches, a technical appraisal of reliability, maintainability; further, support requirements as they would

¹⁰ Ibid., p. D-12.

apply to systems similar to that being considered are also included in the PTA.¹¹

Presentation of the PTA to CNO sets the requirement for the Program Sponsor to respond with an Advanced Development Objective (ADO, Figure 9) stating the need to conduct certain experimental studies, test, and development. By outlining objectives in the ADO, DCNO requires NavAir to document those actions, procedures, and resources needed to describe a specific weapon system requirement. This documentation is called the Technical Development Plan (TDP) and includes plans for the development, production installation, integrated logistic support, reliability, maintainability, test and evaluation, and personnel training for the project. TDP also provides cost estimates and if Formal Contract Definition will be employed, the TDP also contains a plan for the conduct of Contract Definition.

Submission of TDP to DCNO completes the Exploratory Development of the Conceptual Phase. The dominant characteristic throughout this period has been a general level of effort directed toward a specific military problem area with a view of developing and evaluating the feasibility and

¹¹ Navy Logistics Management School, Navy Department Planning and Management Systems Course, Glossary of Abbreviations, Acronyms and Definitions (Washington, D.C., March, 1970), p. 40.

practicability of proposed solutions and determining their parameters.

Advanced Development in the Conceptual Phase (Figure 9) begins with designation of a Project Manager and ends with the Specific Operational Requirement (SOR) which defines a required capability in terms of mission requirement, operational concept and performance constraints.

The Conceptual Phase is highly iterative--its stages overlap rather than occur in exact sequence. Information flow of the interacting inputs of operational need and technology (shown on Figures 9 and 10) bring about the following:

1. Identification and Definition of Conceptual Systems.
2. Analysis (threat, mission, feasibility, risk, cost, trade-offs, etc.).
3. Experimentation and Test (of operational requirements, key components, critical subsystems and marginal technology).

The outputs of the Conceptual Phase are alternative systems (including a preferred system) and their associated program characteristics (costs, schedules, and operational parameters) based on a combination of analyses, experiments and test results. The Service (Figure 11), in this case CNO, has primary responsibility for identifying its operational

	CONCEPT- UAL PHASE	PROGRAM DECISION	VALIDA- TION PHASE	RATIFI- CATION DECISION	FULL-SCALE DEVELOP- MENT	PRODUC- TION DECISION	PRODUC- TION	DEPLOY- MENT
SECDEF	X	O	X	O	X	O	X	X
SERVICE	O		O		O		O	O

RESPONSIBILITIES WITHIN OSD

	SECDEF	DDR&E	ASD (IC&L)	ASD (C)	ASD (SA)
PRIMARY RESPONSIBILITY	O	O	O	O	O
PRINCIPAL RESPONSIBILITY IN OSD		O		X	
SECONDARY RESPONSIBILITY IN OSD		O	O	O	O
MONITORING RESPONSIBILITY		O	O	X	

O PRIMARY RESPONSIBILITY
 O SECONDARY RESPONSIBILITY IN OSD
 O PRINCIPAL RESPONSIBILITY IN OSD
 X MONITORING RESPONSIBILITY

Fig. 11.--Functional Responsibilities in the Process of
Acquiring Major Weapon Systems

Source: Navy Logistics Management School, Weapons Systems Acquisition Course,
Weapon Systems Acquisition (Washington, D.C., 1971).

needs and new systems to meet those needs and: starting a dialogue with OSD on the new systems and the "turning points" for decisions; identifying the competing systems (both conceptual and existing); conducting analyses (threat, feasibility, trade-off studies, risks, cost-effectiveness, etc.); conducting technology and component development and critical experiments; making cost and schedule estimates; and finally optimizing conceptual systems in order to arrive at a proposed system and program.¹²

The decision to continue development of a new major weapon system in any of the military departments is dependent upon a Program Decision (DSARC, Milestone 1, Figure 9 and Figure 11) by SecDef which is part of the PDM discussed earlier in the PPBS chapter.

Within the past four years, two new means of assisting the SecDef in Program Decisions have been developed--the Development Concept Paper (DCP) and the Defense System Acquisition Review Council (DSARC). The DCP was inaugurated in the fall of 1967 because " . . . DOD decision-makers needed precise information on the threat, the operational capabilities needed, alternative means of meeting the threat, forces

¹²Navy Logistics Management School, Weapons Systems Acquisition Course, Weapon Systems Acquisition (Washington, D.C., 1971), p. 3.

needed, time elements, and costs involved."¹³ It is a high-level, objectively prepared, document which ties all of the above requirements into a comprehensive balanced analysis upon which SecDef can make a Program Decision. The DCP clarifies the responsibilities, specifies what has been approved, why it was approved, and includes an assessment of the technology involved. It communicates not only the decision, but also the reasons behind that decision and it insures continuity.¹⁴

In its final form, the DCP has been signed by the Secretary, or Assistant Secretary(R&D) of each military department involved; by JCS; and by various Assistant Secretaries of Defense when their functions are involved.

DSARC was established in May, 1969, when the Deputy SecDef issued a memorandum to that effect. The purpose of DSARC is to advise the DepSecDef of the status and readiness of each major system prior to proceeding to the next phase of the effort in its life cycle. The Council serves " . . . to complement the DCP system, which continues as a formal management and decision-making system for the acquisition of major systems."¹⁵

¹³ "DCP--DOD's Anonymous Management Tool," reprint from Armed Forces Management, December, 1968.

¹⁴ Ibid.

¹⁵ The Deputy Secretary of Defense Memorandum for Secretaries of the Military Departments, Director, Defense

Council review occurs at three decisive points in acquisition: first, when the sponsoring Service desires to initiate Contract Definition (or equivalent effort); second, when it is desired to go from Contract Definition to Full-Scale Development; and third, when it is desired to transition from development to production for Service Deployment (Figures 9, 10 and 11 all illustrate these three key decision points.)¹⁶ Table 4 indicated earlier that each of these decision points might also mean a different contract at each point.

The SecDef decision to continue with an acquisition program (based upon DCP and DSARC) begins the Validation Phase (Figures 9 and 11) or, as it was called, the Contract Definition Stage (Figure 10).¹⁷ The decision or commitment is generally limited to the Validation Phase and the DCP identifies

Research and Engineering, Assistant Secretary of Defense(Comptroller), Assistant Secretary of Defense(Installations and Logistics), Assistant Secretary of Defense(Systems Analysis); dated 30 May, 1969, subject: Establishment of a Defense Systems Acquisition Review Council, p. 1.

¹⁶ Ibid.

¹⁷ Use of the term "Validation Phase" appears to have been a result of the DepSecDef May, 1969, Memo. Although the memo uses the term Contract Definition as a phase, it qualifies the phrase description by the statement "or equivalent effort." As a result of this, plus the fact that the Contract Definition section of the memo uses the term "validity" in five of the eight DSARC aspects, it appears that the Navy has adopted the term "Validation Phase" to include Contract Definition and other methods.

limits on programs approved and thresholds on key program characteristics. These thresholds are operating limits that cause SecDef to review the program if they are exceeded or expected to be exceeded, and they cannot be changed without SecDef approval.

Validation is the phase in which major program characteristics (technical, cost and schedule) are validated through extensive analysis and hardware development by the contractor(s) who will do the full-scale development. The validation is in the form of commitments that contractors are willing to make (contracts they will sign) on the major program characteristics.

As shown in Figure 11, the Service has primary responsibility for the execution of this phase, both in-house and under contract, and for advising OSD of program status, including anticipated or actual breaching of DCP thresholds. The Service (or NavAir) activities include solicitation of contractors, Request for Proposals (RFP's), evaluation of proposals, selection of contractors, award of contracts, collaboration with contractors and planning of future activities. Additionally, the Validation Phase includes the Project Master Plan (PMP on Figure 9) which is a compilation of planning documents prepared by the Project Manager, with assistance from participating organizations and contractors,

and which places in context the plans, schedules, costs and scope of all work and resources to be provided by each participating organization. The PMP defines a management approach for acquiring items and serves to satisfy specified operational requirements.

There are many ways in which this phase can be conducted, however, in this study only two will be discussed--Contract Definition and Parallel Prototype Development (PPD).¹⁸

Contract Definition, as a means of conducting the Validation Phase, is a formal procedure preceding full-scale development. During Contract Definition preliminary engineering and contract and management planning are accomplished in order to arrive at a realistic set of design characteristics, cost estimates, schedules, schedule estimates, definition of high risk areas, as well as definition of system interfaces and management responsibilities. The ultimate objective of this phase is to permit firm fixed price or fully structured incentive contracts. Contract Definition, where directed for major weapon systems,¹⁹ consists of three parts or phases:

Phase A The period in which competing contractors are selected for Contract Definition. It starts with conditional approval of Engineering Development and

¹⁸Navy Logistics Management School, Weapon Systems Acquisition, p. 5.

¹⁹OPNAVINST 3900.8C, p. 7.

ends with an award of Contract Definition Contracts to two or more competing industrial firms.

Phase B Begins with the award of Contract Definition Contracts and ends with the contractors' submittals of Contract Definition reports and development proposals.

Phase C Begins immediately after the submission of Phase B reports and proposals and it ends with the signing of a definitive development contract.²⁰

Parallel Prototype Development (PPD) differs from the above in the area of hardware. Similar actions in terms of paper work occur in both, however, PPD has the added advantage of evaluating hardware. It is preferred to rely more on hardware development and evaluation than just paper studies, since this provides a better definition of program characteristics, higher confidence that risks have been resolved or minimized, and greater confidence in the ultimate outcome.²¹

A major consideration between the two is the increased time and money involved in PPD because it forces contractors to push the state-of-the-art by asking for prototypes.

The result of the Validation Phase is that SecDef must make a Ratification Decision (Figure 11 and shown as DSARC, Milestone 2 on Figure 9). This decision, again based upon a DCP and supported by DSARC, is whether to proceed with the

²⁰ Navy Logistics Management School, Navy Department Planning and Management Systems Course, Project Management in the Navy (Washington, D.C., 1970), p. 40.

²¹ Navy Logistics Management School, Weapon Systems Acquisition, p. 5.

program into Full-Scale Development or some other course of action, for instance, to continue the Validation Phase. If the decision approves continuation to the next phase, the updated DCP identifies the limits of program approval (which are generally limited to conduct of the next phase), and thresholds on key program characteristics.

Full-Scale Development will include development of all items necessary for support of the weapon system--training equipment, maintenance equipment, handbooks for operation and maintenance--which is designed, fabricated and tested. The intended output is a hardware model and the documentation needed to produce for inventory use. An essential activity of the Full-Scale Development Phase is test and evaluation, both that conducted by contractors and that conducted by the military department.

NavAir, through the Program Manager at CNO, has primary responsibility for the execution of the aircraft programs, both those portions that are accomplished in-house and those under contract, and for advising OSD of program changes, status, including anticipated or actual breaching of DCP thresholds. This includes adjustments, within present thresholds, or various program characteristics to protect any threshold that is threatened. NavAir activities include the actual procurement, contract administration, collaboration with contractors,

planning future activities, detailed management of the program, and periodic reporting to OSD through CNO.

As was the case before, Full-Scale Development leads to another DSARC Milestone--Production Decision. The decision by SecDef, again based upon an updated DCP and supported by DSARC (Milestone 3, Figure 11), is on the transition from development to production, i.e., whether to proceed into production for operational use and the quantity to be produced. This is the last of the DSARC decisions, because normally the decision to produce for inventory use is a decision to deploy.²² Once this decision has been made to go into production, the Navy has primary responsibility for execution of the program and to advise OSD of program status, including anticipated or actual breaching of DCP thresholds (Figure 11).

In the foregoing discussion about contracts and the acquisition process, only two major developments or changes were introduced because they were such an integral part of the process. The recent DepSecDef Memo of 28 May, 1970, entitled "Policy Guidance on Major Weapon System Acquisition," which brought about substantial changes affecting contract preference and the various phases were not included because the purpose was to emphasize them by summarization. These changes will be discussed as they relate to the sequential order of the chapter.

²²Ibid., p. 8.

Greater flexibility in the use of contracts was one of the major changes in the Memo. Contrary to the order described in the ASPR (page 41, footnote 2; and Table 4, page 50), the new policy is to tailor the contract type to the risk involved, with CPIF contracts being preferred for both Advanced Development and Full-Scale Development (Figure 9). Use of FFP contracts is encouraged only in those areas: "When risks have been reduced to the extent that realistic pricing can take place" ²³ The thought here is that contracts should not be a hindrance but should be an aid in the acquisition process if and when they are in the best interest of the program.

Policy changes in all development phases are based on the premise that:

The cost of developing and acquiring new weapon systems is more dependent upon making practical trade-offs between the stated operating requirements and engineering design than upon any other factor. This must be the key consideration at every step in development from the Conceptual stage (Phase) until the new weapon goes into the force. ²⁴

Consideration of this factor plus the program schedule structure are important areas to be constantly reviewed. Policy

²³ Deputy Secretary of Defense Memorandum for Secretaries of the Military Departments, Director of Defense Research and Engineering, The General Counsel, Assistants to the Secretary of Defense, and Directors of Defense Agencies; dated 28 May, 1970, subject: Policy Guidance on Major Weapon System Acquisition, p. 5.

²⁴ Ibid., p. 2.

towards scheduling is directed towards allowing time for accomplishing important task objectives " . . . without unnecessary overlapping or concurrency."²⁵

Technical risk, which accompanies most new programs, is to be minimized during Conceptual Development by the following:

1. Risk Assessment--careful assessment of the technical problem involved (shown in the PTA and TDP) and a judgment as to how much effort is likely to be necessary in finding a solution that is practical.

2. System and Hardware Proofing--the Memo stated that the only way to minimize technical risk was to do enough actual design and testing to demonstrate that the risks have been minimized or eliminated. Though mentioned in the Memo as a part of the Conceptual Phase, it may be more appropriate to classify it also under Validation and tie it in with the point made earlier about Parallel Prototype Development.

3. Trade-Off (risk avoidance)--the practical aspect of continual trade-off analysis between stated operating requirements and engineering design was emphasized because they affected program risk and cost to such a large degree. These three means of reducing technical risks were considered so important by the DepSecDef that they are to be reflected

²⁵Ibid.

in the DCP's used for the Program Decision (Figure 11 and DSARC, Milestone 1 on Figure 9).

Contract Definition (in the Validation Phase) is to be less of a paper work study and more a technical risk assessment area. Point Two above made this clear--again the overall direction in the Memo is reduction/elimination of technical risks so that the acquisition process remains controllable.

The Memo stated that Full-Scale Development and Production (Figure 11) would proceed based upon Milestone Decisions (DSARC's 2 and 3 in Figure 9). This policy was covered in the Chapter discussion, however, the Memo adds that in each phase basic trade-off analysis will continually be present and trade-offs will be made where practical.

Production policy is spelled out quite clearly:

The most important consideration before moving into Full-Scale Production on a new weapon system is to have assurance that the engineering design is completed, that all major problems have been resolved, and this has been demonstrated to the extent practical by actual performance testing.²⁶

The overall goals of the Memo appear to be twofold: proper contract selection and minimized technical risk through practical trade-off.²⁷

The rationale that brought about the above changes, including DSARC, can be seen once the complexity of defense

²⁶ Ibid., p. 4.

²⁷ Ibid., pp. 1-6.

contracting is illustrated. Contracting is most difficult in the Defense Establishment because as a rule major systems are not purchased "off the shelf," but have to be developed. Some idea of the time involved in this process was shown in Figure 10. Along these lines, the Weapons Systems Development Group mentioned earlier, pinpointed the Contract Definition Phase (now called Validation Phase) as a main problem area by citing the rigidity of a fixed price type contract:

Contract Definition, as practiced today (1968), does not assure an adequate technical baseline for commitment to a fixed-price type contract for engineering development.²⁸

In their report, the Development Group cited Department of Defense Directive 3200.9, "Initiation of Engineering and Operational Systems Development," in its requirement that the procuring agency not contract for engineering development until first, the required base technology was sufficiently established and second, when primarily only further engineering effort was necessary. The contention of the report was that final configuration could not be determined to an appropriate degree during Contract Definition. Further, the report argued that the current DOD policy and practice (in the 1968 time frame), combined with the severe competitive environment of the defense market, resulted in contractor commitment, at the

²⁸Weapon Systems Development Group, p. 7.

end of Contract Definition, to a firm-fixed price or fixed price incentive fee contract with inappropriately low price ceilings. This coincides with a statement made a year later (1969) by Mr. David S. Lewis, President of McDonnell-Douglas Corporation, when he was asked what he considered to be the major problem associated with development and production of military hardware:

I believe totally in the business of negotiating thorough and well-written, firm, full contracts, and then let's get on with the job. . . . But during a competition (the phases of Contract Definition mentioned earlier) there will be nothing of significance bought by DOD, like big programs. . . . You're (DOD and contractors) establishing contract terms in the heat of intensive competition. . . . So these contract terms that you generate are done in the heat of competition which means tight prices. . . . so we get the price contract and then we are trapped! Everybody is trapped. . . . Technical innovation is something that's largely eliminated, even if you can take the time required to get the agony of the change control system to be operative. . . . But more. . . . important. . . . the intelligence obtained by DOD may indicate that some basic changes are required in defense programs (changes to Program Objectives of the service departments) to meet the test that was actuated when the new program was approved. . . . We are off and running. . . . A year later we are saying that the contract needs to be changed or we won't do the job, not on the old ground rules but on the new. . . . you're in agony. . . . You must change, the money isn't there, and the Air Force is not receiving enough allowance to fill its budget. . . . So here we are asked on the one hand to bid feverishly and competitively. . . . and with the other hand we are asked to take on an excruciatingly high rate of contract risk with ten per cent of the base value of our contract which can be the penalty for five different things; where there is no

mention of incentive except that we are going to be sure that they can't be multiplied up into good earnings.²⁹

The effect of this situation--unidentified remaining technical uncertainties and rigid contracting--in the opinion of the Group causes the following:

1. An increase in the possibility that the government mission requirement will not be satisfactorily met.

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2. An undermining of the basic DOD operational and fiscal planning projections.

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3. The allocation of an inordinately heavy financial risk to the prime/subcontractor structure.³⁰

The Weapon Development Group Report concluded:

" . . . conditions could be substantially improved, if, in the selection of contract type, adequate recognition were given to the degree of technical uncertainty," and it made three recommendations for the solution of the existing situation. It first recommended that the present DOD policy recognize that technical uncertainties in each weapon system are a major factor to be considered in the appropriate contract method determination. Secondly, the report recommended the establishment of a standing board to review and make final

²⁹Panel Discussion, Air Force Institute of Technology (AU) 12th Annual Education with Industry Symposium, 30 September-2 October, 1969, Newport Beach, California.

³⁰Weapon System Development Group, pp. 1-11.

determination of the contracting method to be used on all major acquisitions. Finally, the report recommended the establishment of a working interface with industry to study the problem with the objective of developing further contract selection guidance.³¹

These recommendations were made in September, 1968; eight months later in May, 1969, the new DepSecDef issued the DSARC Memo which established the milestone decision points and essentially adopted the first two recommendations of the Group--the third could also be considered to have been adopted because of the new DOD attitude that existed as a result of the Memo.

The problem of rigid contracting still remained in 1969 (Mr. Lewis' comment in September, 1969) and seemed to be compounded by the full funding policy set forth in Department of Defense Directive 7200.4:

Full Funding is the term used to describe the principle which has been applied by the Congress in providing funds for the DOD programs which are covered within the Procurement Title of the yearly Appropriation Act. . . . The objective is to provide funds at the outset for the total estimated cost of a given item so that the Congress and the public can clearly see and have a complete knowledge of the full dimensions and cost when it is first presented for an appropriation.³²

³¹Ibid., pp. 11-13.

³²Quoted from Secretary of the Navy Instruction (SECNAVINST) 7043.2A, "Full Funding of DOD Procurement Programs, NAVCOMPT:NCC, 12 December, 1969, p. 2.

Any situations that arise either because of unexplained difficulties or budgeting errors brings into play the Program Change Request (PCR) or reprogramming. PCR is a document used in the programming system to forward requested changes to the FYDP for review and action by SecDef. At the Navy level, reprogramming includes the review and approval of both new programs injected through reprogramming and the program sources of funds which are proposed as reductions to support such actions. This is so CNO may exercise proper control over Navy Programs and it is essential that he not only approve the establishment of the basic requirement of these programs, but that he supervise the budgeting and control changes in the budgeted programs during execution.³³

The important points to consider here are that:

(a) FFP contracting may be erroneous in a competitive situation (given Mr. Lewis' statement), (b) full funding is required to understand the full cost of a weapon system program, and (c) DSARC and DCP's are supposed to assist SecDef in program development decision making. An overall acquisition policy was needed to tie it all together--this was the purpose of the 28 May, 1970 Memo which brought about the previously described changes.

³³ Navy Programming Manual, pp. 3-2, 3-3, and 4-4.

Analysis of all the events which led to the present changes in policy are too numerous to mention, however, both the DSARC and Policy Memoranda were originated by the DepSecDef, for this reason, his assessment of previous DOD practices is considered appropriate and the rationale for the changes can be seen throughout the following statements:

Since it is seldom, if ever, possible to achieve the optimum trade-off between performance and cost at the continual trade-off procedure until final design is achieved. I just do not see how this can be done with a Fixed-Price total package procurement procedure except under two possible conditions; (1) where there is no innovation involved, (2) where a contractor is willing to make a firm-fixed price commitment for development and production, and where he has the resources to be able to do so. If he wants to gamble, that is his business, but he should be expected to cover his losses. . . . We must recognize that most of the troubles we see today, such as the Lockheed Problem (C-5A), are not all the contractors' fault. After all, they have been encouraged in these bad practices by policies and practices in the Department (of Defense) for several decades.³⁴

Because the military departments have not managed their programs properly in many cases (so Mr. Packard states), new procurement techniques have evolved. It is interesting to see Mr. Packard's rationale in this area:

. . . there has been an attempt to put more responsibility on the contractors. This is the major thrust of the total package procurement program, and it was based on the proposition that the normal working of

³⁴ Statement of Mr. David Packard, Deputy Secretary of Defense, before the Military Operations Subcommittee, Committee of Government Operations, House of Representatives, Hearings on Weapons System Acquisition, 91st Cong., 2nd sess., September, 1970, p. 12.

the American free enterprise industrial system would do the job if given the chance. . . . This system should work and I think it will, in fact, work when the desired product can be completely and accurately specified in advance, and when the contractor knows exactly how to produce a product to the desired specifications. . . . The basic problem in applying this technique to new major weapons is two-fold. First, precise requirements for a new major system generally cannot be specified in advance. . . . The second problem is that a contractor is often willing to agree to meet the specifications, and in effect gamble that he will luck out, or eventually be bailed out. . . . I believe we have had enough experience by now to correctly draw the conclusion that this so-called competitive package approach to major weapons systems will not work the way people thought it would a few years ago.³⁵

This chapter examined procurement contracts, the procurement process, and recent policy changes and developments intended to update the weapon system acquisition process. It discussed the changes and gave some of the rationale that brought about the changes. Perhaps the two most important aspects of the chapter are that it indicated a change in DOD attitude in terms of (a) contract selection and (b) the importance of continually assessing technical risks in any major weapon system development.

³⁵ Ibid., pp. 13-14.

CHAPTER IV

EXTERNAL FACTORS AFFECTING AIRCRAFT PROCUREMENT

The last two chapters dealt with internal revisions initiated by DOD for the purpose of making, among other things, its procurement efforts more effective and efficient. This chapter will discuss factors external to DOD control which can affect aircraft procurement.

There are so many weapon systems in the DOD inventory that it is necessary to isolate a specific one and investigate what external factors acted on it, rather than attempt a "survey" approach which might end up chaotic due to the wide diversity of even one military department's inventory. Based upon the single approach technique, the acquisition by the Marine Corps of the Sikorsky CH-53 Heavy Assault Helicopter will be reviewed for the purpose of determining what external factors might have affected its procurement process. The thought here will be to develop a cause-and-effect type discussion.

The New York Times Sunday edition of 26 August, 1962, carried the following article:

"Marine 'Copter Contract Averts Sikorsky Lay Offs"
 Stratford Connecticut, August 25: The Sikorsky
 Division of United Aircraft Corporation here has
 received a multimillion-dollar contract for the
 production of heavy assault helicopters for the
 Marine Corps.

The award, announced today, averted a lay-off of
 design and production workers, according to the
 company.

William P. Gwinn, President of United Aircraft
 Corporation, said he was unable to disclose the
 exact amount of the contract. He said the helicopter
 would be an adaption of the Sikorsky S-64 "Flying
 Crane."¹

The above announcement was made five months after the
 FY 63 Military Appropriations Act (H.R. 9751) was approved by
 Congress and was the culmination of over three years work in
 the Marine Corps and Navy to seek a replacement for the
 Marines' large assault helicopter, CH-37C, due to be phased
 out of the inventory in 1967.

A summary of events for the period 1959-1963 will
 serve the purpose of providing the necessary background events
 which led up to the contract award and it will also provide a
 comparison of acquisition processes--this is shown below:

16 March, 1959	CNO published Operational Requirment Number AO-17501 (second revision SOR) and Development Characteristics Number AO-17501-1.
27 March , 1961	CNO promulgated Development Characteristics Number AO-17501-3.

¹New York Times, 26 August, 1962, Section L, p. 65.

Promulgation occurred because the Tri-Service Vertical Take-Off Land (VTOL) competition of 1961 was looked upon as the answer, but it failed to produce an aircraft suitable for Marine use. Other Tri-Service VTOL research procurements were quickly analyzed and it was found that none of them could provide production aircraft in time to replace the CH-37C on schedule in 1967.²

9 October, 1961	Preliminary Technical Development Plan (TDP) for VTOL Assault Transport Helicopter (Heavy) was published by the Bureau of Naval Weapons (BNW).
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This occurred because CNO directed that a design competition be entered into on a "hurry up" basis, since so much time had already been lost.

10 January, 1962	A revised Preliminary TDP for the HH-X (CH-53A) helicopter is published by BNW.
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7 March, 1962	Request for Proposals (RFP) were mailed by BNW.
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Competition here was conducted to provide a helicopter based upon the Operational Requirements originating with AO-17501 which was revised 16 March, 1959. Requirements for the Assault Transport Helicopter were:

. . . contained in the Type Specification, TS-156, from which the major items are: Maximum gross weight

²CH-53A Log Book maintained by Mr. E. A. Rossi, Configuration Control Officer, Naval Coordinated Project Office (APC-255), Naval Air Systems Command, Department of the Navy, (Washington, D.C., 1970), p. 2.

of 35,000 pounds, multi-engine, crew of three, all-weather, compatible with Amphibious Assault Helicopter Carriers, wheels type landing gear, power blade folding, for transportation of cargo, equipment, and troops, seats for thirty troops, rear ramp boarding, internal cargo handling system, external cargo hook, 8000 pound payload, 100 NM radius (8000 pounds out and 4000 pounds back). Vmax of 160 kts. Vcruise of 150 kts, hover ceiling OGE of 6000 feet and rate of climb of 100 feet per minute, with one engine inoperative on hot day.³

Due to the short period of time available (1962-1967) for the needed introduction of the HH-X into service, it was determined that it would have to be a development based on an existing model because " . . . there was no time to R&D a new one from start."⁴ The competition was therefore limited to Sikorsky and Vertol who could base their designs, respectively, on the S-64 crane helicopter and the Army HC-1B (new designation is H-47) Chinook. Almost by accident, this became an example of parallel prototype development because some four years earlier, Sikorsky had begun development of the S-64 through the use of Independent Research and Development Funds,⁵ and Vertol was far along with development of the HC-1B.

³ Ibid., p. 1.

⁴ "The History of the CH-53," article based upon notes of the Configuration Control Officer, and The CH-53A Log Book, and prepared by Naval Coordinated Project Office (APC-255), Naval Air Systems Command, Naval Material Command, Department of the Navy (Washington, D.C., 1969), p. 6.

⁵ Statement by United Aircraft Corporation on Independent Research and Development Funds for submission to the Committees on Armed Forces, United States Senate, United States House of Representatives, 91st Cong., 2nd sess., March, 1970, p. 12.

2 April, 1962	Specific Operational Requirement (SOR) number W14-06 (HH-X), Assault Transport Helicopter (Heavy) was issued--it was an updated SOR from the original.
7 May, 1962	Proposals from two contractors were received. ⁶
26 July, 1962	Chief, BNW, approved the results of the Evaluation.
24 August, 1962	Winner of evaluation was announced as Sikorsky.

The Sikorsky proposal was favored based partly on technical aspects, " . . . there was much more confidence in the Sikorsky design based on production and maintenance aspects,"⁷ and mainly on the bid price. Sikorsky's winning bid was \$15 million for R&D Engineering and four R&D helicopters plus \$94 million for 100 succeeding production helicopters; total bid was \$109 million. Vertol bid \$35 million for R&D and \$125 million for production; total was \$160 million.

7 February, 1963	Contract awarded for development of the CH-53A.
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The award to Sikorsky could not be made until this time because some of the money had been withdrawn from the program (reprogramming). The Program Manager had only \$10 million for

⁶"When the procurement was publicized, Kaman expressed a desire to bid, intending to base their design on the Fairey 'Rotodyne' for which they were licensee. They never bid because they lost their license prior to submitting a bid," "History of the CH-53A," p. 1.

⁷CH-53A Log Book, p. 2.

the R&D portion. Over a six week span, Sikorsky reduced their R&D bid from \$15 million to \$10 million and altered the number of R&D aircraft from four to two. The company also agreed to charge all primary tooling and engineering over the first fifty-five production aircraft following the two R&D aircraft, thus present funding requirements were transferred to the future, when sufficient funds would be available as budgeted. Sikorsky further agreed to remain one-half year ahead of current production requirements on aircraft sets of components, enabling BNW to be one-half year ahead with current funds. Production options called for in the contract are shown in Table 5.

TABLE 5
PRODUCTION OPTIONS FOR FY 63 CH-53A CONTRACT

Option	FY	Lot	Aircraft Quantity
1st	64	III ^a	16
2nd	65	IV	24
3rd ^b	66	V	40
4th	67	VI	24

^aLots I and II were for first two developmental aircraft. Total aircraft to be produced amounted to 106 aircraft if all options were used.

^bThis option was divided to compensate for the fifty-five aircraft agreement: (a) 15 aircraft; (b) 25 aircraft.

Source: Negotiated Contract Number NOW 63-0150-f between the Bureau of Naval Weapons, Washington, D.C. and the United Aircraft Corporation (Sikorsky Aircraft Division), Stratford, Connecticut, 7 February, 1963, p. 15.

The Firm-Fixed Price contract, signed in accordance with company policy, as well as the news release and the previous IR&D testimony, indicated that the technological capability of the company was sufficient for most of the "technical uncertainties" to have been resolved. The Sikorsky Division was certainly in the position to meet one of DepSecDef Packard's stated exceptions to fixed-price, total package procurement procedures, " . . . where the contractor is willing to make a firm-fixed price commitment for development and production, and where he has the resources to be able to do so."⁸

During the 1962-1963 period when the contract details were being worked out, the Kennedy Administration had been in office almost three years, PPBS was developing under the then SecDef McNamara, and one Marine Helicopter squadron was operating in South Viet Nam. The point here is that in February, 1963, when the contract was signed, it was not possible to plan for all of the contingencies that would arise later that year or in the next few years. In November of 1963, President Kennedy was assassinated and Vice President Johnson assumed office--this was the political climate of the country at the time. That year (1963) also saw the fall of South

⁸See page 72, footnote 34.

Vietnamese President Diem and the actual beginning of a U.S. build up in that country.⁹

CH-53 development continued without much in the way of complications--unfortunately, it was not that way politically. On August 2, 1964, the U.S. Destroyer Maddox was attacked by North Vietnamese torpedo boats in the Gulf of Tonkin. Full evaluation of all the facts relative to this attack and a subsequent one on August 4, 1964, are beyond the scope of this study; however, the rapid succession of events which followed culminated in the unanimous passage in the Congress of the Joint South East Asia Resolution on 7 August, 1964, more commonly known as the "Tonkin Resolution." This blanket resolution gave the President the power to

. . . take all necessary measures to repel any armed attack against the forces of the United States and to prevent further aggression . . . The U.S. is . . . prepared, as the President determines, to take all necessary steps, including use of American Forces, to assist any member or protocol state (of SEATO) requesting assistance in defense of its freedom.¹⁰

Based upon the Resolution, a more rapid build up in Viet Nam began after the Presidential election of 1964 and with the build up came the increased requirement for more military equipment--including helicopters. As a result of the increased

⁹ Chester L. Cooper, The Lost Crusade--America in Viet Nam (New York: Dodd, Mead and Company, 1970), pp. 237-239.

¹⁰ Ibid., p. 240.

military requirements, the CH-53A contract was reopened in 1965 and thirty-five more aircraft were ordered for FY 66 to cover anticipated combat losses. Table 6 shows a revision of the options (the first three had already been exercised) which pushed Option 4 to become the FY 68 buy.

TABLE 6
REVISIONS TO PRODUCTION OPTIONS FOR
FY 63 CH-53A CONTRACT

FY	Original Number	Additions
64	16	None
65	24	None
66-67	40	35 20 by Apr 66(FY 66) 9 remaining FY 66 6 by Sep 66(FY 67)
68	24	None

Source: The table constructed from Amendment of Solicitation/Modification of Contract Number NOW 63-0150-f and from a personal interview with Mr. Kent Linkins, Supervisory Contract Negotiator (Sikorsky and Overhaul & Repair) AirFrames Purchasing Division, Naval Air Systems Command.

Funds for the additional helicopters came from the Supplemental Budget Request for \$700 million from President Johnson--it was known as the Emergency Fund, South East Asia. Of the \$700 million, " . . . \$180 million . . . will be used for the procurement of aircraft and helicopters and for

the procurement of additional spare parts and items of that kind."¹¹

It is interesting to note that political activity was at such a high pitch during this period that the Budget Request was sent to the Congress on 4 May, 1965, and passed the House the next day and the Senate the day after.¹²

Activity, both political and military, had an effect on the National Economy as shown in Table 7 by the increased DOD Expenditures and employment in the aerospace industry.

The figures indicate that from a low employment point in 1964, the influence of DOD PPB was beginning to make itself known. This is most notable in FY 66 when the planning begun in 1964, and the Budget Request for South East Asia (SEA) had a material effect on the economy--GNP, DOD Expenditures and Aerospace Employment all showed a significant rise. Without going into too much statistical detail, the figures reflect a build up after the May, 1965, Supplemental Request--a build up which continued until 1969. The time "lag" which occurs from

¹¹U.S., Congress, Senate, Senator Stennis speaking for the Emergency Fund, South East Asia, H.J.R. 447, 89th Cong., 1st sess., 5 May, 1963, Congressional Record, 9492.

¹²U.S., Congress, House and Senate, Tabulation of Voting in House and Senate on Emergency Fund, South East Asia, H.J.R. 447, 89th Cong., 1st sess., 5-6 May, 1965, Congressional Record, 9540-41. House: 408 yes, 7 no, 18 not voting. Senate: 88 yes, 3 no, 9 not voting.

incident to reaction can be accounted for by the planning, programming, and budgeting involved (it is about eighteen months from the start of a budget until it is submitted).

TABLE 7

GNP--DOD EXPENDITURES--AEROSPACE EMPLOYMENT
CY/FY 63-67

CY	GNP (Billions)	FY	DOD Expenditures (Billions)	Aerospace Industry Employment
63	\$590.5	63	\$49.973	446,000
64	632.4	64	50.786	434,000
65	684.9	65	47.098	458,000
66	747.6	66	55.181	560,000
67	793.5	67	68.315	610,000

Source: Aerospace Facts and Figures 1970, Aerospace Industries of America, Inc., published by Aviation Week & Space Technology (New York: McGraw-Hill, 1970), Table 7 is a compilation of figures from pp. 6, 10-11, and 84.

The situation which developed in 1964-1965 may not have been completely foreseen by planners, or it was and the combat attrition aspect may have been thought of as causing appropriations problems in Congress, especially since the SEA military effort in previous years was relatively small. In any event, the timing was much better for a budget request when it followed the Joint Resolution, and it in fact enabled the Marine Corps to obtain a total of 141 CH-53A Helicopters once the modified

contract was completed. It should be pointed out that the planning which began after the Tonkin Incident in 1964 also ordered a one-year speed up in deployment of the CH-53A's and this was absorbed in the program without much difficulty because of the earlier Sikorsky contract agreement to stay one-half year ahead of current requirements.

A review of what took place in terms of CH-53A Development indicates that in 1959 when planning pointed to a replacement need for the CH-37C, some kind of acquisition process was set in motion. It progressed through a programming phase (FYDP 63-67) which established an aircraft total for the Program Element to achieve its mission as a portion of the overall Marine Corps Program Objective, and incorporated the quantity into a contract. After contract changes concerning R&D Engineering had been made, budgeting was able to provide the prescribed amounts of funds to obtain the aircraft.

What began in 1959 as an ordinary acquisition rapidly turned into a development and production race against time because of the political (or external) factors present in the November, 1963, to May, 1965, time frame.

In 1968, another FFP procurement contract was signed by Sikorsky and NavAir for an additional 124 CH-53D's.¹³ These

¹³ Negotiated Contract Number N00019-68-C-0471 between the Naval Air Systems Command, Washington, D.C. and the United Aircraft Corporation (Sikorsky Aircraft Division), Stratford, Connecticut, 1968, p. 3.

CH-53D's were a later model with increased lift capability. The planning, etc., for this contract, again figuring the eighteen month lag, took place in 1966--a year after the build up started and at the same time the 35 additional CH-53's were ordered. The contract time frame was CY 69 to CY 71 with production based upon the schedule in Table 8.

The production and delivery schedule is shown because it indicates the company (Sikorsky) will have no CH-53 back-orders as of January, 1971. Scheduled production was established and was to continue based upon the expected attrition losses. When losses were not as high as anticipated, the contract for the CH-53D was considered to be the final buy of the helicopter --this determination in 1969 was made at the peak of the SEA Involvement, in terms of DOD Expenditures (see Table 9).

This year (1969) also saw the Nixon Administration take office and initiate a descalation policy towards South Viet Nam involvement--this is reflected in Table 9 by the reduced DOD estimates for FY's 70 and 71 which were the first years to come under the Administration control.

With the beginning of the reduction in Defense Spending and resultant drop in production, the aerospace industry began projecting production figures and relating these to employment numbers. In the case of Sikorsky, the company projected that their working force would go from a December, 1969, total of 11,000 down to a December, 1971, total of 2,500, which

TABLE 8
PRODUCTION SCHEDULE FOR FY 68 CH-53D CONTRACT

CY 69												CY 70												CY 71													
J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
2	3	3	4	4	4	9	9	9	9	9	9	4	4	4	4	4	4	4	4	4	4	5	5	-	-	-	-	-	-	-	-	-	-	-			
FY 69												FY 70												FY 71												FY 72	

Source: Negotiated Contract Number N00019-68-C-0471 between the Naval Air Systems Command, Washington, D.C. and the United Aircraft Corporation (Sikorsky Aircraft Division), Stratford, Connecticut, 1968, p. 26.

TABLE 9
TOTAL DOD APPROPRIATION EXPENDITURES
(BILLIONS)

FY	Expenditures
63	\$49.973
64	50.786
65	47.098
66	55.181
67	68.315
68	78.027
69	78.666
70	^a 77.000
71	^a 71.191

^aFY's 70 and 71 are DOD estimates

Source: Aerospace Facts and Figures 1970,
Aerospace Industries of America, Inc.,
published by Aviation Week & Space
Technology (New York: McGraw-Hill,
1970), pp. 11-12.

coincides with the production schedule in Table 8. The latest CH-53D contract would be completed and a forthcoming contract with NavAir for a minesweeping model (RH-53) would be in either the FY 72 Budget, which would coincide nicely, or the FY 73 Budget, which would cause problems. The same was true of the West German and United Kingdom CH-53 contracts.¹⁴ What this meant quite simply was that the company did not, and probably would not, have work during CY 71 to remain operational (see Table 8). Sikorsky would keep its key personnel and attempt to stay in business until contracts for additional work could be signed.

When the plight of the company became known at the local, state and national level, pressure was brought to bear on DOD and NavAir. Both Senators and the Governor of the State of Connecticut conferred with DOD and NavAir to seek some kind of solution.¹⁵ Any situation which occupied the personal attention of so many high officials in dealing with DOD, especially when they were all from the same state, bears some analysis. There were three main factors to consider:

1. The fact that Sikorsky did not have any contracts in CY 71 of any substantial degree meant it would be faced with a financial crisis that might lead to shut-down.

¹⁴ Interview with Supervisory Contract Negotiator, NavAir.

¹⁵ Ibid.

2. In the event the company had to shut down, or even reduce its working force substantially, because of no contracts, the skill base and technology of a company that developed an assault heavy helicopter in 1963 and had it flying in combat in 1966, would be lost. The fact that a prime contractor would be out of business would make procurement of spare parts difficult for the company's helicopter models in existence.

3. A slow-down or shut-down of the company would result in an overall increase in local, state and national unemployment. This was probably the most important factor considered by the officials who conferred with DOD and NavAir.

Some economic facts about the State of Connecticut will bring the third factor in clearer focus. Connecticut has ranked second behind California for the past five years in terms of average employment in the aerospace industry.¹⁶ The Hartford area is the third largest aerospace market area in the country.¹⁷ These two facts, plus the state's ranking of fourth throughout the country in terms of Military Prime Contract Awards and Per Cent of U.S. Total, give an overview to the position the state found itself in once Defense Spending declined.¹⁸

¹⁶Aerospace Facts and Figures, p. 90.

¹⁷Ibid., p. 91.

¹⁸Ibid., pp. 101-102.

The result of the pressure was reopening of the CH-53D contract with the following changes:

1. A third year would be added to the production period.
2. Third year production would include "sliding" sixteen aircraft into that year, taking the production period to December, 1971 (and into the first half of FY 72).
3. There would be no price per aircraft increase, but DOD (NavAir) would pay Sikorsky between \$7.5 to \$7.9 million for engineering and tooling expenses. The amount was about equal to the overhead for the "stretched" production period.¹⁹

The Sikorsky situation is not unusual in the aerospace industry. A review of the daily newspapers and weekly news magazines seems to indicate that much of the economic and unemployment problems in the country are due to a reduction in Defense Spending from the FY 68 to FY 70 peak periods. Further proof of this economic factor is that some of the hardest areas hit in the form of unemployment were also the aerospace industry leaders. Such states as California, Connecticut and Washington have had unusually high unemployment percentages since the reduction in force began.

To complicate the situation in yet another way, the increased efforts mentioned in the previous chapters implied a maximization of efficiency and effectiveness--meaning the cutting of costs in all areas. A reduction in military forces

¹⁹ Interview with Supervisory Contract Negotiator, NavAir.

brings with it less spending and a glutted labor market that is already overcrowded.

An example of the austerity that can result is the following quote:

General: Funds must be programmed for flight hour operations on an austere basis. Flight hour programming, on which financial requirements are predicted, must be projected on the basis of realistic anticipation of actual accomplishments.²⁰

The above would sound reasonable for regular squadron policy, however, it pertained to RDT&E aircraft.

Another example of external factors influencing aircraft procurement is in the F-15 Development Contract award to McDonnell-Douglas Corporation with an estimated production option of 520 aircraft costing some six billion dollars. The loser in the competition was North American Aviation which was subsequently awarded the B-1 Development Contract (B-52 replacement). Both companies in the competition could have been hurt financially if they did not get the contract, for this reason once the award was made to McDonnell-Douglas, it was an anticipated fact that North American would get the B-1 Development Contract " . . . because they were in trouble and needed a big contract."

²⁰Naval Air Systems Command Instruction (NAVAIRINST) 7110.2, "Funding Requirements for RDT&E Aircraft," 22 April, 1970, p. 1.

The F-15 example brings about another type of situation in which the reported amount of the development contract may re-stimulate economic activity in the geographical area of the company--only to find that the amount of aircraft to actually be produced is much less. This was the case with McDonnell-Dougals and the F-15--only twenty aircraft are to be produced at present.²¹ The question of pressure being applied (as in the Sikorsky example) in order to maintain an economic or employment level in an area seems to be not how much should be applied, but rather in which of several areas should it be applied to do the most overall economic and employment good. The question comes back to the original Sikorsky contract in 1963 which averted a layoff. If, instead of proceeding into full-scale production, the acquisition process was turned back to the Validation Phase, or even if funding was not available, could pressure be brought to bear to revive a contract or else generate another contract for economic stability in an area? The recent SST experience appears to be the basis of a resounding negative to the whole question--at least in the present political climate.

²¹Statement of Mr. Philip N. Whittaker, Assistant Secretary of the Air Force(Installations and Logistics) before the Military Operations Subcommittee, Committee on Government Operations, U.S., Congress, House of Representatives, Hearing on Weapons System Acquisition, 91st Cong., 2nd sess., September, 1970, pp. 9-10.

The above may argue subsidization of the aerospace industry as an alternative. The time element in weapon system development was shown in Figure 10 on page 49. It took almost three years to develop the CH-53 and this was because of previous research that had been conducted--it seems reasonable to assume that the development period would have been much longer if no earlier research had been done. In addition to time, another consideration is the cost. Table 10 is a cost breakdown for the CH-53A.

The cost breakdown in Table 10 could be considered small in the aerospace industry when compared to F-4 or F-15 contracts, however, for one company (Sikorsky), it was its prime source of income--once that income declined or stopped, the financial stability of the company was affected. The amounts above are shown to identify some of the relative costs and to also show the economy to scale that results once the tooling, etc., have been accomplished--the result is a substantial investment, completely specialized for production of large helicopters. Even in the case of the CH-53, it costs large amounts of time and money to develop a weapon system to meet the specifications that were set in the SOR in order to accomplish the Program Element Mission. Though the time, money and effort may have commercial spin-offs in such areas as commercial aviation technology and state-of-the-art, the main

TABLE 10
COST BREAKDOWN OF THE FY 63 CH-53A CONTRACT

ARTICLES AND SERVICES	SUBTOTALS	TOTALS
Tests and Aircraft Mock-up	\$ 508 226	
Lots I and II: Model CH-53 @ \$4 572 138 each	9 144 276	
Contractor Support Items	243 131	
Reconditioning and Modification (each item)	1	
Technical Personnel Support (each item)	1	
Weapons Readiness Achievement Program	<u>100 000</u>	\$ 9 995 635

OPTIONS

Options	Lots	Quantity	Unit Price		
1st	III	16	\$1 583 824	\$25 341 184	
2nd	IV	24	1 306 192	41 348 608	
3rd	V(a)	15	1 233 658	18 504 870	
	V(b)	25	748 850	18 721 250	
4th	VI	24	779 560	<u>18 699 444</u>	\$132 610 987

OPTION PRICES

Engineering Costs

III	16	\$ 285 014	\$ 4 560 224	
IV	24	226 549	5 437 176	
V(a)	15	226 549	<u>3 398 235</u>	\$ 13 395 635

Tooling Costs

III	16	\$ 173 734	\$ 2 799 744	
IV	24	138 097	3 314 328	
V(a)	15	138 097	<u>2 071 455</u>	\$ 8 165 527
				<u>\$154 172 149</u>

Note: This Cost Breakdown includes only the original contract buy options and not the additional 35 for South East Asia.

Source: Negotiated Contract Number NOW 63-0150-f between the Bureau of Naval Weapons, Washington, D.C. and the United Aircraft Corporation (Sikorsky Aircraft Division), Stratford, Connecticut, 7 February, 1963, pp. 15-18.

direction at the time of the contract is for the company to successfully complete what it contracted to do. Once this has been accomplished, the contractor may find that he has no other customers for his product. This may have been part of the reason 83% of a group of 295 aerospace executives from the 500 largest U.S. manufacturing companies stated they were not interested in seeking additional defense contracts. Many (52%) said they were not seeking to become more heavily engaged in defense work, while others (10%) cited the low profitability of the industry.²² The figures in Table 11 would seem to bear the latter statement out.

The average net profit after taxes as a percentage of sales for the period cited in Table 11 is 2.85%.

The point to the discussion is that production, engineering and tooling costs in a development such as the CH-53 bring about a high degree of specialization and investment. As a result of the large investment, the time involved in development, and the relative low rate of return on that investment, competition within the industry demands even more specialization. This specialization is of great importance

²²Based upon interviews conducted by ORC Caravan Surveys, of Princeton, New Jersey, a division of Opinion Research Corporation, for the Aerospace Industries Association of America, Inc. The interviews took place during the last half of October, 1970. Aerospace News Release, Washington, D.C., 1 December, 1970 (P.A. Release Number 70-46), pp. 1-2.

and advantage during production, etc., but when the contract is reduced or discontinued, or even completed with no follow-on --it is difficult to market a product such as an Assault Helicopter or an all-weather fighter commercially. To make matters worse, even if a customer were located, national security might prohibit such sales.

TABLE 11

TAXES AND PROFITS--AEROSPACE INDUSTRIES

Year	Net Federal Taxes as a Percentage of Total Income	Net Profit after Taxes as a Percentage of Sales
1963	47.5%	2.3%
1964	46.9	2.6
1965	46.7	3.2
1966	45.2	3.0
1967	44.5	2.7
1968	46.6	3.2
1969	43.9	3.0

Source: Aerospace Facts and Figures 1970, Aerospace Industries of America, Inc., published by Aviation Week & Space Technology (New York: McGraw-Hill, 1970), p. 97.

The Sikorsky company developed an assault heavy helicopter that was operationally ready and in combat in three years. A major reason for this was its IR&D of a similar type of helicopter some four to five years earlier. If this is what is possible, while the company is functioning, what would be the

relative cost, time and capability requirements to bring the same development about if the company had to first be established? Many would say it would cost more to establish, organize, and assume a technological capability in a new company than it would to subsidize a company and keep its capability on a reduced but still operational scale--Sikorsky is one example of this approach. A situation of this nature could be considered one definition of the "warm base concept." It would be where it is imperative that the industry be kept operational to meet the needs of future requirements resulting from changing service department Program Objectives and it would be kept operational by means of subsidization.

Another approach along the same line would be that "production" would take the form of overhauling operational aircraft the company had produced. Overhaul work of this nature is usually conducted at Naval Rework Facilities. In the case of the Boeing-Vertol CH-46, when its contract was completed with no follow-on, the company began overhauling small numbers of CH-46's to keep the facility operational.

Perhaps one of the biggest problems in terms of external factors is that of the time lag. The lag could pertain to engineering, development, or production--it takes time to develop a complete weapon system. The concurrency method has been tried and in many cases found to be the more expensive.

It also received unfavorable comments from DepSecDef in Chapter III. By concurrency is meant concurrent development and production. One major problem with this approach is that, " . . . inadequate analyses of the concurrency risks involved result in over-optimistic estimates of both cost and schedule."²³ The present DOD policy of increased prototype development vice contract definition appears to be effective, but it also takes time and costs money--especially to the competitive loser.

The effects of various external factors affecting the procurement process have been discussed, these included:

1. Independent Research & Development that a company may be able to accomplish.
2. Economic effects of defense spending on contractors.
3. Minimal investment return to aerospace contractors and its effect on industry incentive for defense contracts.
4. National and international policies which can affect the industry.
5. Political pressures which arise in defense contracting.

²³ "Control of Changes in Naval Weapon Systems Acquisitions," a compendium of factors affecting the need for changes, and Navy Actions to minimize and control changes, Headquarters, Naval Material Command, February, 1970, p. 3.

6. The "warm base" concept as a means of maintaining critical industrial capabilities.

All of the above in one form or another represent factors that may or may not have been considered by DOD in the procurement process.

Procurement of weapon systems may possibly be made easier if a helicopter requirement, for instance, could go from DCNO(Air) to NavAir and then to a Defense Industrial Agency which would produce it. History has proved the error of this approach. The Morrow Board in 1925 examined the pros and cons of such a situation and concluded that the government was dependent upon private enterprise for the design and manufacture of aircraft, and that these manufacturers should be well-staffed and competent (presumably through government assistance). The Board defended such areas as proprietary rights and encouraged independent research:²⁴

The great lesson of World War I had been that better weapons are more important than more weapons and that the way to meet this demand is to rely on the incentive offered private enterprise, not on the routine procedures of government-operated arsenals.²⁵

²⁴Claude Witze, "Private Enterprise and the Public Interest," reprint of article from Air Force/Space Digest: The Magazine of Aerospace Power, Washington: Air Force Association, 1962, pp. 8-10.

²⁵Ibid., p. 7.

The question of independent versus government-owned aerospace industries may be settled on the common ground of subsidization, though here again, the same external factors enumerated above will have to be considered.

This chapter has discussed factors which are outside the control of the military procurement process system and its supportive planning, programming, and budgeting. Its purpose has been to show that for the procurement process to remain effective and dynamic, both government and industry need to constantly evaluate their ever-changing environment and attempt to accommodate to that environment in a rational manner.

CHAPTER V

SUMMARY AND CONCLUSIONS

Three major areas affecting aircraft procurement have been studied--PPBS--Contracting--External Factors. The objective of the study has been to review the three areas and major revisions to them to decide if the latter do indeed enable procurement procedures to operate better.

The point was made in the Introduction that though Defense funding has been reduced, it was still DOD's (and the Navy's) responsibility to maintain national security by means of an up-to-date weapon systems inventory--to successfully accomplish continued acquisition within reduced funding meant that the procurement process should adopt the most effective and efficient procedures available to it.

PPBS revisions were studied in Chapter II with the above thought in mind and four major changes to the system were reviewed.

The first was the Strategic Guidance Memorandum (SGM) which was issued by SecDef based upon the results of the

Joint Chiefs of Staff, Joint Strategic Objectives Plan-I (JCS JSOP-I). The goal of the Strategic Guidance Memorandum (SGM) was to provide current and completely coordinated strategy guidance for the entire defense community. Once the strategic guidance was determined, the second major system change was implemented--Fiscal Guidance (FGM). The purpose of this revision was to establish the fiscal constraints within which strategy guidance was to be carried out and it necessarily led to the third revision which was the Joint Force Memorandum (JFM). This Memo was a JCS effort to accomodate its overall plans and objectives (JSOP-II) to the published fiscal constraints. Once this was accomplished, the individual military departments then developed their own Program Objectives (POM) which were reviewed by SecDef as to applicability to the Department objectives. Acceptance of Program Objectives by means of the PDM enabled a more integrated and financially responsible approach upon which better budgeting estimates could be developed.

Procurement Contracting was next reviewed along with the procurement process because revisions to the process affected contract selection and rationale. Chapter III first listed three of the more common contracts (FFP, FPI, and CPIF) and discussed advantages and disadvantages of each. It then considered the procurement process and pointed out two new

developments upon which more effective program decision-making could be based. These were the Development Concept Paper (DCP) which objectively presented the service department's activities in any program effort for which a SecDef decision was needed in order to continue. The second was Defense Systems Acquisition Review Council (DSARC) which reviewed an acquisition procedure at three critical stages in order to determine if certain milestone decision points had been reached upon which the acquisition could proceed without running into great difficulty. The milestones were set after the Conceptual Phase, Validation Phase, and Full-Scale to Production Phase. A third development in weapon system acquisition and perhaps the most important was the DepSecDef Memo on Acquisition Policy Guidance which stressed risk assessment throughout and clearly defined contracting guidelines based upon a more practical approach. Finally, the Memo addressed itself to the area of practical trade-offs based upon evaluation of the risks between engineering design and operating requirements. The Memo in effect tied in all of the major areas of the acquisition process and established common guidelines for each. The chapter then concluded with the rationale that brought about the changes affecting procurement contracting.

Determination of external factors affecting procurement was taken up next in Chapter IV and the method used was to

follow a specific aircraft from development to deployment. It was difficult to establish any revisions in this area because DOD had no control over changes, instead the chapter presented what actually happened as a guide upon which to base the effectiveness of the two previous chapters.

PPBS was shown to have a definite influence upon the acquisition process and the national economy once a military build up was instituted. Contracting procedures were also reviewed in the context of actual development to show how flexible and helpful they can be. The chapter then illustrated several factors ranging from the importance of Independent Research & Development (IR&D) in a critical period to the relatively small return on investment that exists in the aerospace industry. Additional factors included the effect National policies, economic policies, and political pressure had on a procurement process. The chapter concluded with a discussion of the "warm base" concept and some of the arguments presently being considered in its behalf.

The overall conclusion arrived at in this study was that the revisions or affects in each of the areas were a reaction to past or present conditions. It was felt that the direction and intent of the revisions was sound but that a more in depth evaluation of each could not be fully recognized at the present because of the relative newness of each. It

takes time to evaluate a revision and most of those discussed came about within the past two years, some even within the past ten months. It is still too early to tell for instance, what the total effect of the PPBS Revisions will be since the Budget was submitted only four months ago. Another factor in evaluation is what has gone before, and here the past is not that much of a help because of the present de-escalation taking place.

PPBS revisions were certainly a reaction to the practices of the previous eight years in DOD. They were a reaction to a centralized system that did not always allow for dissent or communication of a contractive nature. The influx of a new political administration and DOD appointees in 1969 were seen as a major breakthrough in modernizing procurement procedures and PPBS. The key to the entire PPBS revision was the participative and involved climate that developed with the new DOD staff. This was reflected in the form of new documents which were added to PPBS--each one involved or affected the entire system and attempted to make the PPBS Cycle more of a practical application of good management than of a pragmatic approach to a difficult and unwieldy situation. The very fact that the Management Conference was called four months after the appointees were in office is indication of the need to revise and the importance the new appointees placed upon it. Of all that was done to revise the Cycle, it is felt that the

participative management approach will have the greatest and most lasting effect. Having military departments set their own objectives and insuring overall conformance to established security requirements is difficult but not impossible--setting individual department objectives from a centralized position may be the more impossible situation.

Introduction of Fiscal Guidance early in any planning process requires early decision-making and this is not easy. It was introduced in PPBS as a necessary revision because of the inordinate amount of time that was being spent preparing budgets which exceeded limitations, requiring much additional effort in establishing conformance. This revision, in the form of the FGM, is felt to have the second most important effect on PPBS. The other three memoranda are essentially based upon the participative approach, yet fiscal guidance must of necessity be more centralized if it is to accomplish its purpose of allocating scarce resources. The setting of dollar limits cannot be left to any group, especially if different interests are involved. It must be authoritative, yet flexible, and emanate from a single source--and it does in DOD.

To draw any conclusions in the area of revised contracting procedures is to imply practicality. The approach taken by the DepSecDef in both of his Memos is directed toward the use of contracts and contracting procedures as a useful means of

accomplishing a difficult undertaking, namely major weapon system development. The implementation of such things as DCP and DSARC appeared to be almost an obvious necessity because of the practical logic that went into them. Even though the DCP came into being much earlier, it is felt that with the present DOD leadership, it would have come about eventually.

Probably the most important revision in procurement contracting is in the Policy Guidance Memo, for it is here that standards and guidelines are established which direct and place direct responsibility in any procurement effort. It is felt that by tying in all of the major aspects of procurement contracting into a policy statement and then requiring the widest dissemination possible of this statement represents a major change in DOD--one that will develop into a more practical and effective way of acquiring weapon systems.

Finally, in the area of external factors, the conclusion is that it is too dynamic at this period in time to evaluate, but this appears to beg the question since nothing ever remains static in the real world. The conclusion then is that both private industry and government need to analyze and study external factors much more than has been done. The warm base concept is but one example, IR&D and return on investment are others, yet they are all interrelated because even these three can make or break a company and thus alter the country's defense

posture potential. It is considered an absolute necessity that a council similar to DSARC, be established which could begin to analyze present defense-industry problems in a declining DOD Budget, and seek some overall approaches to the problems. The council would consist of DOD, industry and Presidential Economic Advisors who might be able to establish "milestones" in the national economy and define areas which must be met or else positive action would be taken. If the aerospace industry in the country falls below a certain number of prime contractors, there should be every effort made, including subsidization, to re-establish the level. This is more easily said than done, but it is felt that the decision to analyze external factors affecting weapon system procurement and to take such action as shall be deemed necessary is one of national importance--the furor over the SST in the past year is certainly the best argument for action along these lines.

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- Mr. Edward F. Speck, Budget Analyst, PAMN Appropriation,
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- Mr. Kent Linkins, Supervisory Contract Negotiator, Airframes
Purchasing Division (Sikorsky and Overhaul & Repair),
Naval Air Systems Command.
- Mr. Thomas H. Jefferies, Deputy Project Coordinator CH-53A/D,
Naval Coordinated Project Offices, APC-255, Naval Air
Systems Command.
- Mr. Edward A. Rossi, Configuration Control Officer, Naval
Coordinated Project Offices, APC-255, Naval Air Systems
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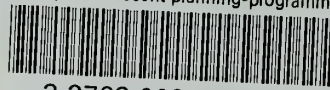
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